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The Nature of Modern War

General J. Lawton Collins
Deputy Chief of Staff, United States Army *

NATIONAL security today is more than ever before a matter of teamwork; teamwork, not only between the Army, the Navy and the Air Force which make up the Military Establishment, but also between the Military Establishment, the State Department and the whole civil economy of our United States.

After World War I, the public settled back and said: "Well, we have won this one. Thank God, we will never have another. We are through with this business of war. We don't want to hear any more about it. That is the job of the Army and the Navy. That is what we pay them for. Let them worry about it." Thereupon everyone settled back, and the Army and Navy receded into their shells.

In the Army today we feel very keenly that we must not let that condition develop again because the problems of national security are too profound, and their ramifications too great, to trust them to the military services alone. We are confident that any war of the future, as never before, will be total, and that it will touch whole populations to a degree hard for us in the United States to imagine. We know that the last two World Wars were not fought solely by people in uniform. The greatest proportion of those who fought in uniform were civilians a few short months or years before the pay-off. Wars cannot therefore be considered as just a responsibility of the regular forces. It is the responsibility of us all.

The past two wars have proved to the world that the United States is the major military power that would have to be defeated before any nation could dominate the world.

Twice the Germans have given us the time necessary to gear up our great industrial plant, to call in the National Guard and the Organized Reserves, to set up a selective service machinery, to raise and train the great land, sea and air forces that we produced. They gave us the time because our great ocean barriers and our allies prevented them from direct physical assault on our homeland.

We feel that we will never again have that cushion of time. Airpower has knocked down our barriers. We can be subjected to attack in our homeland at the outset of hostilities. And this is the most profitable target an enemy could conceive of, because, if struck successfully, our power to mobilize our great internal resources—our mass production indus-

* From an address before the National Defense Conference, Norwich University, 12 February 1948.

At the very hour hostilities begin in any future war, there will be a tremendous demand for trained military manpower to counter the enemy's initial blows and to prevent him from striking again

try—may be crippled at the outset. This would be a prize so tempting that no intelligent world aggressor can be expected to overlook it.

In the event of another conflict, we can bank on such an attack being made. Therefore, in all our planning we must recognize that time will no longer be on our side, that we will be the first nation, probably, that is struck. In all our calculations, then, we must consider what we are capable of doing immediately upon the outbreak of any possible future war.

Counter-Offensive by Air

Although a combination of airpower and the atom bomb have brought about this increased vulnerability of attack, they do not in themselves offer us a complete defense.

If we were an aggressor nation, if our democratic tradition allowed the possibility of a "preventive war," it might be argued that air superiority and the atom bomb, provided those weapons are maintained as monopolies, give us the power to prevent defeat by striking down a potential enemy before she gained the airpower and atomic power to strike at us.

But our domestic traditions do not admit of the concept of a "preventive war": we are not assured of a monopoly of atomic weapons, nor are we guaranteed superiority of airpower. Since we rule out the possibility of preventing another country from building up the air and atomic power with which to attack us, we must of necessity prepare our defenses on the assumption that we will be so attacked.

Any defense based on the assumption of surprise attack on our homeland must provide a plan which will permit us to withstand the initial shock while we strike back at once to knock out the enemy's potential to hit us again. This must be followed without delay by a tremendously accelerated mobilization of our total resources to furnish the means for a decisive military effort to knock the enemy out of the war.

Trained Manpower

The first two elements of a sound defense plan—(a) the ability to absorb initial blows without losing the will to fight, and (b) the ability to counterattack at once to knock out the enemy's potential to strike our homeland again—set up a tremendous demand for trained military manpower at the very hour hostilities begin.

The first role requires trained units spread out all over the country, which by their very numbers cannot possibly be regular units but must of necessity consist of militarily trained civilians.

The second role—immediate counterattack—sets up a demand for large numbers of highly trained regular units, largely air and airborne, capable of seizing and occupying air bases from which the enemy can strike our homeland. These regular forces must be immediately augmented by adequately trained reserve and supporting units capable of replacing the departed regular units. Then these efforts must be expanded to include seizing bases from which our airpower can strike the enemy's homeland and serve as a platform on which we can build our expanded military machine for decisive final action after mobilization of our total resources.

That is a big order and it will require more than two million trained men at the very outset of another war. But it is an unavoidable consequence of developments in air and atomic power and of the deterioration of international relations.

Geographic Position

Wars, heretofore, have been fought generally east and west around the globe. We think that in the future they are more likely to be fought over the top of the world, at least in the initial phases.

When you consider possible future wars

in this light, you are struck at once by the fact that the Atlantic and Pacific oceans really do not separate us from the Eurasian continent, and that we are much closer to the Eurasian continent than we had ever thought. We have a common frontier with Eurasia all across the top of the world.

For example, from Spitzbergen to New York City is only 3,500 miles by air, while from Iceland the distance is only 2,700 miles. From Eastern Asia to Fairbanks, Alaska, is a relatively short hop by air, and any enemy that seized Fairbanks would be only 1,500 air miles from Seattle and only 3,000 miles from Detroit. Actually, America is quite close to the great Eurasian land mass, where the bulk of the people of the world live.

The great industrial centers of the world are located in the northern hemisphere. Using polar routes, aircraft with a radius of about 5,000 miles can reach all of these centers. That should give us no reason to feel an advantage. Surely we might reach any enemy's arsenal in a relatively few hours. But the reverse is also true; our great industrial concentrations can be reached over the polar ice-caps with equal speed. There are no one-way streets in the sky. And we cannot be secure in the apparent fact that we are the only nation with new, long-range aircraft. Even with weapons as complex as the atomic bomb we have been warned that any nation can learn the secret of their production and many nations could, in time, build the facilities to produce them.

That is the picture of the world as it is today. It has shrunk to such a degree that yesterday's outlying areas are now next door. In a world of such fantastically abbreviated distances, in a world filled with the turmoil of conflicting ideologies, war can be thrust upon us with paralyzing swiftness and surprise. It is against these initial blows that we must be prepared. We must not only be prepared to withstand them, but also to stop them, meanwhile girding ourselves to retaliate with the will and the capability to carry on to final victory.

Trained Units in Being

Now the paramount question is how to stop the enemy's initial blows. The answer lies on the same map. We do not now occupy—and short of an impossible preventive war cannot expect to be occupying—the bases from which an enemy can strike us.

Unless we plan to take continued punishment after the first surprise blow, we must push the enemy off those bases that he may hold. This takes ground forces. We must seize others that he may not occupy in force. This takes more ground forces. We must occupy bases and repulse his attempts to dislodge us. This takes still more ground forces. We must go on and seize and hold additional bases from which we can pound away close-in with our airpower. All this will take great numbers of well trained ground forces.

And again, the task of seizing bases is no more a one-way street than the airways themselves. We can expect an enemy to be employing hundreds of divisions from the outset of hostilities in this highly complex business of modern war.

Consider Alaska, which could be worse than Pearl Harbor and a hundred Bataans if we were not prepared to defend and support it strongly from the start. Consider Greenland, Iceland and Spitzbergen. We do not hold them now. Are we to expect a world aggressor to respect the neutrality of these keys to our internal resources? Are we to expect a world aggressor to operate under the same rules as we have set for ourselves?

We know that we can rely on quite the contrary. We know that these bases will have to be fought for if they are in enemy hands. That will require many ground troops, and once such bases are taken the ground troops will be subject

to the heaviest kind of assaults to dislodge them. They will have casualties which must be replaced with trained men. They must be supported and reinforced by trained units. And these trained replacements and supporting and reinforcing units must be trained before we are attacked, if they are to be ready in time to counterattack.

Progressive Mobilization

If the ability to absorb initial internal blows through ready reserve units and civil defense be considered the first phase of our defense plans, and if the defensive and offensive base-seizing role be considered as the second phase, then the third phase is progressive mobilization.

This requires a plant in being. We will never again, through two clear years of warning, count on being able to pass a Selective Service Act as we did in 1940 and then begin to build the reception centers and the training camps and all the other facilities required by an army in training. They must be in being or we may well never have them. Never again can we count on lend-lease and an Office of Production Management to commence tooling up and building a new munitions industry two years before a large-scale demand for munitions arises. We must have the reserve munitions on hand and we must have the production plant in being, or we may never have them. This lesson seems difficult to explain.

Somehow people readily accepted the fact that when the ironclad dreadnaught superseded the wooden ship we had to build a dreadnaught industry in peace if we wanted a modern navy in modern war. They also accepted the self-same fact with regard to a combat plane industry; namely, that if we want such an industry in war, we have to maintain it in peace.

But somehow the Army is supposed to spring to non-existent arms overnight. A Navy is not a Navy without warships. An Air Force is not an Air Force without combat planes. And a modern Army is not a modern Army without modern munitions.

This country no more has a munitions industry as part of its normal economy than it has a warship or combat plane industry. If you want to maintain it in peacetime, it has to be bought. Air forces without air bases are not air forces. And it requires ground forces to take and hold air bases. Ground forces require trained men, trained units, modern equipment and modern munitions, if they are to be ready in time to seize and hold air bases.

Unless the units and their equipment are in being when the gong strikes, they will not be ready in time. That is the crux of the problem.

Total Mobilization

Only through an accelerated mobilization with its manpower training and processing plant in being, and through adequate industrial preparedness to equip troops as they are needed to execute joint plans, can we hope to convert our potential resources into effective military strength with the speed that will be required by the tempo of future war. A future war will be so destructive that any delay in bringing the war to a speedy conclusion through an early final all-out decisive offensive would be rightly construed as criminal negligence of our homeland and of our posterity.

The Regular Army is now charged with almost sole responsibility for the occupation of Germany and the Far East. This is a heavy burden and we are extremely short-handed in carrying the load.

In the defense of the United States only two and a fraction understrength divisions are presently available, and they must also provide any striking force required in an emergency. For the missions of expanding our forces and effecting

total mobilization, practically no forces remain.

In fact, we are performing the occupation mission largely at the expense of preparedness for our four major tasks, which I have just discussed. While there is a certain military value in the occupation, there is also considerable risk. Due to the fact that the Ground Army is required to carry practically the whole load, and due to the fact that this load consumes the greater part of the Army's budget and personnel, there is very little left to prepare the Army to perform its share of the defense plan for the United States.

The current Regular Army requirement for ten divisions, plus the necessary supporting troops and support for the Air Force, means that we have a military manpower need of about 670,000, divided roughly into two equal parts; one part serving here at home and the other overseas. It must be understood that for every soldier overseas we must have at least as many here to maintain our supply and training facilities, operate ports and transport services, and keep up our essential military school system and establishment for training and mobilizing the National Guard and Organized Reserves. The Army is also charged with providing supply services for the Air Forces.

The Guard and Reserves

Thus, today, the Army is understrength to perform even its dangerously restricted current occupation role. Never before has our military strength been more dependent on the strength and readiness of the National Guard. In any emergency, not only would the Guard have to step in and replace regular units directed to new emergency missions, but it also would have to carry the burden of internal defense as well. Similarly, the bulk of the support and mobilization roles devolves on the Organized Reserves. Yet today these components are as incapable of performing their emergency roles as is the Regular Army.

This picture of our personnel problem, both in the Regular Army and in the Civilian Components, is not a pleasant one. But it is the unabridged truth and the truth is often unpleasant.

Our requirements for a Regular Army remain at 670,000 as it has for more than two years during trying international conditions which have rapidly deteriorated as far as our national security is concerned. Some of our tasks are being endangered and others are being poorly executed, according to desired standards, through shortage of personnel. The situation cannot be allowed to disintegrate further in these critical times.

As far as the Civilian Components are concerned, there are several essential actions to be taken. Primary among these is the procurement of trained personnel in adequate numbers. We cannot get the numbers needed by volunteer means. Even if we could, all our experience within a lifetime that has seen the tempo and technique of war unbelievably advanced, proves conclusively that training in the Civilian Components at the pre-war or present levels can never cope with the challenge ahead of us.

Nov 1948

As long as there are nations which would resort to intimidation and force, we invite aggression if we lose our ability to strike back.

General Omar N. Bradley

General Buckner's Decision Against a Second Landing on Okinawa

Historical Division, Department of the Army

This article is a part of the forthcoming volume, "Okinawa: The Last Battle," written by Roy E. Appleman, James M. Burns, Russell A. Gugeler, and John Stevens, in the historical series, "The United States Army in World War II." It is based primarily on statements by and interviews with various commanders and staff officers. No contemporary records were found of the numerous discussions of the subject, which were largely informal. As is evident, it has been impossible to fix the time and content of the discussions with any great degree of accuracy.

The sources used are as follows: statements of Brig. Gen. Elwyn D. Post, CofS, Tenth Army, 10 Jun 46; Brig. Gen. Laurence E. Schick, DCofS, Tenth Army, 13 Jun 46; Brig. Gen. David H. Blakelock, ACofS, G-4, Tenth Army, 8 Feb 46; Col. Virgil Shaw, ACofS, G-3, Tenth Army, 6 Feb 46; Brig. Gen. Oliver P. Smith, Marine DCofS, Tenth Army, 30 Jul 46; Lt. Gen. John R. Hodge, CG XXIV Corps, 1 Feb 46; Lt. Col. Max Meyers, ACofS, G-2, 77th Div, ..Apr 46; Capt. Edmund G. Love, 27th Div Hist Off, 23 Feb 47; interv 1st I & H Off with Gen. Buckner, CG Tenth Army, 15 Jun 45; with Maj. James H. McMullen, G-3 Sec, Tenth Army, 18 Jun 45; with Brig. Gen. Walter A. Dumas, ACofS, G-3, Tenth Army, 9 Jul 45; with Lt. Col. James R. Weaver, ACofS, G-2, 13 Jun 45; interv XXIV Corps Hist Off with Col. John W. Guerard, ACofS, G-3 XXIV Corps, 1 Jul 45; with Col. Cecil W. Nist, ACofS, G-2, XXIV Corps, 15 Jun 45; with Brig. Gen. Josef R. Sheetz, CG XXIV Corps, Arty 23 Jun 45; with Col. Kenneth C. Strothers, DCofS for Opns, XXIV Corps, 27 Jun 45; with Capt. Mervin A. Elliott, G-2 Sec, XXIV Corps, 27 Jun 45. Interviews conducted by the XXIV Corps Hist Off are recorded in the Okinawa Diary, XXIV Corps, kept by Maj. Roy Appleman, on file in the Hist Div, WDSS; Appleman, XXIV Corps History, Vol. IV, Annex II, has a useful discussion of the entire problem. For Japanese plans and dispositions see Interrog Yahara; Tenth Army Transl No. 246, 8 Jul 45; *32d Army* Ord No. 170, 22 Apr 45; Transl No. 244, 7 Jul 45; *32d Army* Ord No. 172, 23 Apr 45; Transl No. 273, 13 Jul 45; *32d Army* Ord No. 175, 26 Apr 45.

The first American troops had reached the shore of Okinawa on 1 April 1945, at 0830.—*The Editor.*

THE proved strength of the Japanese defenses in Okinawa and the costliness of reducing them even with the aid of so powerful an arsenal of weapons as the American forces possessed, raised the question of making an amphibious landing south of the Shuri line to envelop the enemy's Shuri positions.

It had been hoped that the 7th, 27th, and 96th Divisions, supported by massed artillery, could penetrate the Shuri line. But failure of the attack of 19 April dispelled the expectation of an early and easy penetration of the enemy defenses. If any doubt remained about the kind of fighting that lay ahead before Okinawa could be won, it was dissipated by the heavy combat and high casualties experienced from 19 to 24 April in penetrating the first main ring of the Shuri defense zone. Even this gain was small, and it was evident that it would take a long time to reach Shuri at the rate of progress of the first three and a half weeks of the operation.

The question of a second landing in southern Okinawa was considered by Tenth Army most seriously by 22 April. General Andrew D. Bruce, commander of the 77th Division, knew that his division would be committed in the Okinawa fighting as soon as Ie Shima was secured. At

Leyte the amphibious landing of the 77th Division behind the Japanese line at Ormoc had been spectacularly successful. General Bruce and his staff wished to repeat the move on Okinawa and urged it on the Tenth Army command even before the division sailed from Leyte. As the Ie Shima fighting drew to a close, General Bruce pressed his recommendation to land his division on the southeast coast of Okinawa on the beaches just north of Minatoga. He believed that it would be necessary to effect a juncture with American forces then north of Shuri within ten days if the venture was to be successful. His plan was either to drive inland on Iwa, a road and communications center at the southern end of the island, or to push north against Yonabaru.

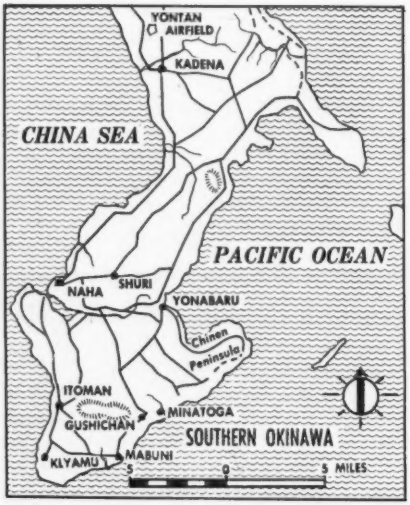
General Simon Bolivar Buckner, Jr. rejected the idea. His assistant chief of staff, G-4, stated that he could supply food but not ammunition for such a project at that time. The Minatoga beaches had been thoroughly considered in the planning for the initial landings and had been rejected because of the impossibility of furnishing adequate logistical support for even one division. The reefs were dangerous, the beaches inadequate, and the area exposed to strong enemy attack. Although beach outlets existed, they were commanded by both the escarpment to the west and by the plateau of the Chinen Peninsula. The Tenth Army intelligence officer reported that the Japanese still had their reserves stationed in the south. Both the *24th Division* and the *44th Independent Mixed Brigade* were still in the area and could move quickly to oppose any landings. Artillery positions on the heights overlooking the beaches were fully manned. The 77th Division would be landing so far south that it would not have the support of the troops engaged to the north or of XXIV Corps artillery.

Moreover, at the time the 77th Division was available, around 21 April, all three Army divisions in the line—the 7th, 27th, and 96th—were in a low state of combat efficiency because of casualties and fatigue. The Tenth Army commander felt that it was of paramount importance to relieve these divisions as far as possible in order to maintain the pressure against the Japanese. Furthermore, the full strength of the 77th would not have been available: the division had left garrison forces on the Kerama Islands and Ie Shima which would not be replaced immediately. General Buckner felt that any landing on the southeast coast would be extremely costly, "another Anzio, but worse." Unless a juncture between the diversionary force and the main body of his troops could be made within forty-eight hours of the landing he felt that he could not endorse the plan. A juncture within such a period of time being obviously impossible, the general's disapproval was patent.

Logistical difficulties figured high in General Buckner's rejection of a second landing on southern Okinawa; the alternative adopted was a frontal assault with two corps against the Japanese Shuri Line

Looming even larger than the question of where to commit the 77th Division was that of how best to use the 1st and 6th Marine Divisions in conquering southern Okinawa. The 2d Marine Division, which had been sent back to Saipan, was scheduled to invade Kikai, north of Okinawa, in July; thus its employment on Okinawa was to be avoided if possible. The 6th would not be available for the southern front until relieved of its security mission in north Okinawa; this was effected early in May by the 27th Division. The 1st Marine Division, however, could be moved south

to enter the line at any time, except for one consideration. In Phase III of the original plan for ICEBERG, the island of Miyako, in the Sakishima Group just north of Formosa, was to be invaded after Okinawa had been taken. The V Amphibious Corps, scheduled for this operation, had suffered so severely at Iwo Jima that Tenth Army was directed on 13 April to keep III Amphibious Corps free from heavy commitment that would interfere with its possible use at Miyako. Reconnaissance of Okinawa after the American landings had



disclosed that the island had far greater potentialities for development as an air base than had been thought, and the strategical aspects of the entire operation were therefore reconsidered. On 26 April Admiral Nimitz sent a dispatch notifying Tenth Army that the Miyako operation of Phase III had been postponed indefinitely by the Joint Chiefs of Staff in Washington, thus freeing the III Amphibious Corps for full use on Okinawa.

Doubtless in anticipation of this decision, Tenth Army had already considered the problem of where and how to commit the two Marine divisions standing by in northern Okinawa. Landings on the Minatoga beaches were rejected for the same reasons as were adduced in the case of the 77th Division. The beaches from Machinato air field to Naha were not considered suitable because their use would create supply problems and because the strong Japanese positions west of Shuri overlooked the coastal flat. The vicinity of Itoman farther south on the west coast was studied, but the formidable reef there discouraged such a plan. The southern tip of the island was sheer cliff along the shore. Landings along lower Buckner Bay were considered impracticable because Japanese artillery on the Chinen Peninsula and on the hills east of Shuri completely dominated the area and could prevent naval gunfire support ships from entering the bay. The commanding general of XXIV Corps Artillery believed that landings here would end in catastrophe, that artillery could not be put ashore, and that if it could be, it would be largely destroyed. In addition the time element was unfavorable: it would take an appreciable time to obtain shipping from the 1st Marine Division and mount it out, while the 2d Marine Division, which still had its shipping, would have to be brought back from Saipan. If Marine troops were to be committed in the south, it would be much quicker to move the 1st Marine Division down the island by road to the established front.

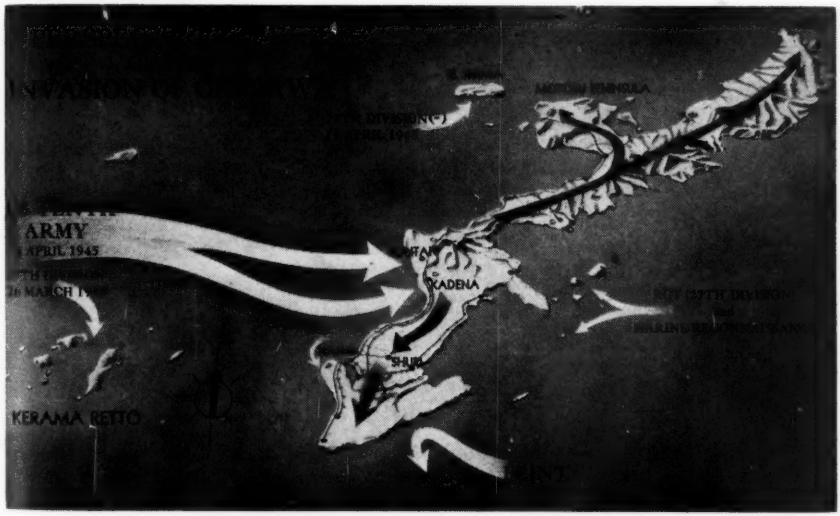
Later, about 26-28 April, three staff officers of Tenth Army visited XXIV Corps headquarters and talked over with Col. John W. Guerard, G-3, XXIV Corps, the tactical problems involved in committing III Amphibious Corps to the battle in southern Okinawa. Colonel Guerard had noticed that identifications of Japanese *24th Division* troops had been found during the past few days of fighting. These seemed to indicate that the enemy command had moved the *24th* to the Shuri

front and that the Japanese rear areas, accordingly, were more lightly held than formerly. Colonel Guerard believed therefore that a landing in the south, to which he had hitherto been opposed, was now feasible. He urged this view on the Tenth Army officers and recommended landing the marines on the Minatoga beaches at the southern base of the Chinen Peninsula. When informed of this discussion by Colonel Guerard, General John R. Hodge agreed that a landing of the marines in the south was tactically desirable. Early the next morning General Hodge went to Tenth Army headquarters to urge this view. The proposal was rejected on the ground that a major landing in the south could not be supported logistically.

Tenth Army staff officers, advising against additional landings, contended that there were no suitable landing beaches on the west coast; that it would be very difficult to supply even one division on the southeastern beaches; that two diversionary landings, one on each coast, would result in a dispersion of force with each division being contained in its beachhead. They considered the entire plan too hazardous; the troops would come up against strongly held Japanese positions in an area where the terrain favored a strong defense, and the landings could not be supported by artillery. General Buckner believed that the need for fresh troops was greatest on the Shuri front, where they could relieve the battered divisions already on the line.

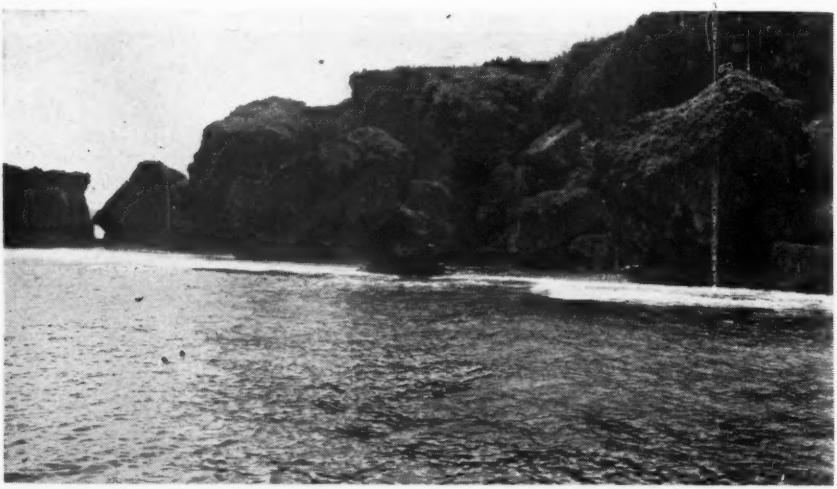
Relying on the advise of his staff, General Buckner made his final decision against amphibious landings at some time between 17 and 22 April; thereafter the matter, although raised again, was not given serious consideration by Tenth Army. General Buckner came to the conclusion that the landings were not feasible either tactically or logistically. Admiral Nimitz later flew with his staff members from Guam to Okinawa to confer with General Buckner and other commanders present and concurred in the decision which had been made.

The chief reason for the rejection of



a second landing seems to have been logistical—the judgment that a landing in the south could not be supplied. This judgment was confirmed during the later stages of the campaign when the 7th Division, in possession of the Minatoga area, was supplied by landing craft over the beach: despite the relatively quiet conditions, the tonnage unloaded never reached a satisfactory level because of the inherently unfavorable beach conditions, and landing craft had to be supplemented by overland supply from Yonabaru. Aggressive forward movement after a landing might have eased the initial logistical difficulties but not to a very great extent. A second major consideration was the danger that any beachhead might be contained by the strong Japanese forces in the area. The truth was, indeed, that the Japanese fully expected and almost hoped for another landing in the south, fore-shadowed by the L-Day feint, and kept a large body of alerted troops there to meet just such a contingency. After having committed most of these troops to the Shuri front, they prepared a substitute plan to oppose landings in the south, whereby from 2,000 to 3,000 troops in the area were to fight a delaying action while the main forces consolidated a strong perimeter defense around Shuri.

While before the end of April any attempted landings in the south with one or two divisions might have failed—and certainly would not have succeeded except with heavy losses—later the situation became more favorable. The Japanese *24th Division* was committed piecemeal to the Shuri front between 23 April and 4 May, and the *44th Independent Mixed Brigade* was brought up on 26 April, although it did not enter the battle immediately. These changes weakened Japanese strength south of the Shuri line, and the Japanese counterattack of 4-5 May brought about a still greater depletion of the enemy's resources. The prospect of success for a



The southern coastline of Okinawa presents rugged cliffs over fifty feet high and dangerous reefs off-shore.—Army Signal Corps photo.

southern amphibious landing thus greatly improved between 5 and 21 May; a landing then would have been justifiable could it have been supplied. By that time, however, the Marines had already been committed to the Shuri front. Moreover, after Tenth Army turned the enemy's right flank on 21 May there was no longer any need for a second landing.

The Japanese command, expecting American landings in the south and prepared to meet them, could not understand why they were not made. The prevailing opinion among the Japanese was that the American command wished to obtain as cheap a victory as possible by wearing down the Shuri line rather than to risk troops in a hazardous landing in the south, though the latter course might bring the campaign to a speedier end.

By their decision General Buckner and his staff committed themselves to the alternative basic tactics of the battle for Okinawa—a frontal assault by the two corps against the Shuri line and an attempt to make a double envelopment of Shuri. The choice was a conservative one: it avoided the risks inherent in another landing under the conditions which would have attended it. It was definitely decided to bring the III Amphibious Corps from northern Okinawa and the 77th Division from Ie Shima. Efforts were also made to speed up the logistical preparations necessary for another general attack. Until sufficient troops and supplies should be at hand the Tenth Army would continue its attack against the second Shuri defense ring with as much force as available resources permitted. For the time being the tactical aim would be to consolidate and advance the American lines for the purpose of gaining a better position for the big attack.

Not only were the European partners of the Axis unable to coordinate their plans and resources and agree within their own nations how best to proceed, but the eastern partner, Japan, was working in even greater discord. The Axis, as a matter of fact, existed on paper only. Eager to capitalize on the preoccupation of the western powers in Europe, Japan was so greedy for her own immediate conquests that she laid her strategy, not to help Germany defeat Russia and Great Britain, but to accumulate her own profit. Had the way been open, Germany and Japan would have undoubtedly joined their armies in Central Asia, but to Japan this objective was secondary to looting the Far East while there was no real force to stop her.

General of the Army George C. Marshall

The National War College

Colonel Ward T. Abbott, *United States Air Force*
Former Instructor, Command and General Staff College

Introduction

A BRIEF account of the background of events leading up to the establishment of the National War College will be helpful to an understanding of the mission of the school. During World War II it became increasingly apparent that the rise of the United States as a global power was forcing a closer integration of our strategic military planning with our foreign policy than had ever before been necessary. It was found that the Army, Air Force or Naval officer working on a strategic concept of operations could not limit his thinking to the purely military aspects of his problem; he must also know what is politically or economically possible or impossible in every theater of operations. Similarly, the diplomats in our Department of State could not implement our foreign policy effectively without knowing the military requirements and objectives of ourselves and our allies. To accomplish this needed integration, the State-War-Navy Coordinating Committee was created during the war, and functioned very effectively in correlating the various military and diplomatic aspects of our strategic national planning and the implementation of those plans.

The experience gained in the operation of the State-War-Navy Coordinating Committee indicated clearly that none of the Departments concerned had adequate numbers of personnel with suitable background or training for work of so wide a scope as was found to be involved in the problems on which the committee had to work. The political, economic and military status of nations all over the world had to be carefully and completely evaluated with respect to possible effects on our strategic national planning in order that we could formulate workable plans and policies. It was found that this work of evaluation and formulation for national planning cannot be done effectively by specialists trained only in one particular field, whether it be diplomacy, politics, economics, or military strategy. Our national plans and policies are based on a balanced combination of *all* those factors, and can therefore best be formulated by individuals trained to consider all those factors and to weigh one against the other.

Organization of the College

The National War College was established in 1946 under the Joint Chiefs of Staff, in cooperation with the Department of State, to meet this need for personnel especially trained for high-level planning and policy-making. It is organized and conducted along the same joint lines as the other two schools under the Joint Chiefs of Staff (the Armed Forces Staff College and the Industrial College of the Armed Forces) but with a fourth element—the Department of State—added to the three military departments.

The Department of the Treasury, the

Central Intelligence Agency, and the Bureau of the Budget have accepted invitations to send one student each to the third class.

The staff is headed by a commandant and three deputy commandants, selected one from each of the four departments involved. The balance of the permanent staff is composed of about twenty-five officers in approximately equal proportions from the three armed forces, organized on a joint basis into various instructional sections plus a small administrative staff.

The function assigned to the National War College is to train officers of the Army, Air Force, Navy and State Departments for duty in planning and policy-making agencies at the highest military and governmental levels. Its course of instruction is therefore designed to give the students the broadest possible education in *all* of the factors which determine our national policy, and to stimulate their thinking along the lines of how best to provide for our national security in the future, *all* factors being considered.

The National War College, established in 1946, is designed to train officers of the Army, Air Force, Navy and State Departments for policy and planning duties on the highest military and governmental levels

The Course of Instruction

The scope of such a course is tremendous. During the first semester the students study the following: (1) the interest and objectives of the United States and other powers in order to understand how United States foreign policy is formulated and how it can be carried out without resorting to war; (2) the United Nations, regional pacts, bilateral and multilateral agreements, and other means designed to avoid war and to further peace and national security; (3) the implications of atomic energy and other new weapons in the fields of war potential and national strategy, international relations, and world order.

During the second semester subjects of a more military nature are taken up in the light of knowledge acquired during the first semester. These include: (1) the military force necessary to implement national policy in peace and war; (2) the grand strategy of the application of all political, economic, and military forces to implement the national policy; (3) an understanding of science and technology, and the implications which modern discoveries and developments place upon the Armed Forces; (4) war planning and employment of joint forces on the theater of operations and higher levels.

The National War College was faced with a major problem in trying to organize a course of instruction and decide on the methods of instruction which would insure adequate coverage, in the ten months available, of the many and diverse fields of knowledge involved. At the very start, they called on the best civilian educators in the country for assistance, and after lengthy consultation evolved the course of instruction just outlined. The scope of the subjects to be covered in the international phase was found to be so much broader than the background of most military officers that is was decided to borrow five top-flight professors from civilian universities and attach them to the faculty during the first semester.

This civilian faculty has primary responsibility for conducting the first semester's course. They bring to the college not only their extensive knowledge in such fields as history, economics, international law, and foreign relations; they

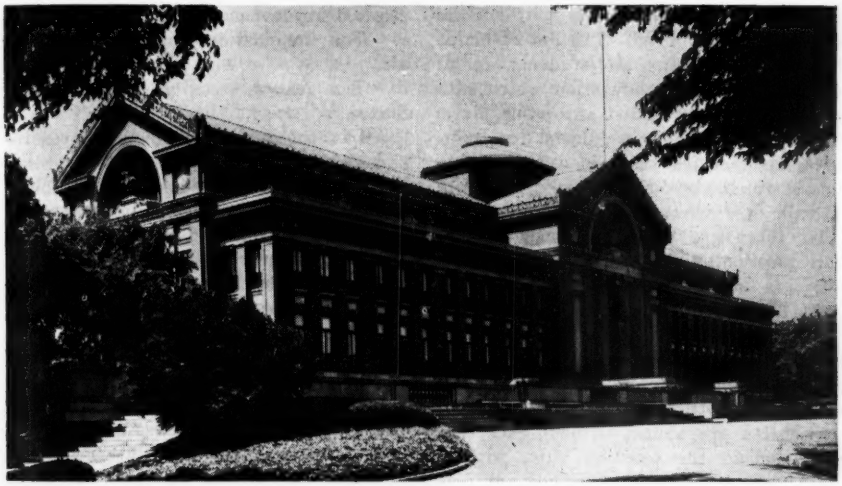
also bring a civilian viewpoint to all discussions which keep jolting the students out of the rut into which the so-called "military mind" is accused of getting. And it appears also that the students keep jolting the "college minds" out of their academic ruts, with the result that a mutual respect is built up and maintained between the class and civilian faculty. The professors who serve with the National War College return to their universities with a new understanding of military problems and policies, which better equips them to discuss the armed forces amongst the faculties and students with whom they work.

Aerial view of Fort Lesley J. McNair, Washington, D.C., showing the main National War College building in the center.

Methods of Instruction

The National War College faculty settled on two basic methods of instruction; namely, lectures and committee discussion groups. These two methods proved to be admirably suited to their needs.

For its lectures, the College is able to draw on the top men in their various fields from this and other countries—diplomats, military leaders, industrialists, scientists, educators, economists, etc. All of the lecturers seem to come on the platform with the feeling that they have a real message to impart, and that their audience will be vitally interested in learning what they have to say. The college assures them that what they say will be "off-the-record," and they take full advantage of that immunity. The College makes no attempt to limit the scope of their talks, within the broad general subjects on which they had been asked to speak, so they give their personal ideas free play. Frequently, a lecturer will succeed in distilling the results of a lifetime of specialized study or experience into a fifty minute talk. And frequently there will crop up wide diversities in opinion between lecturers, or different ap-



The National War College was established in 1946 to train personnel of the three military Services and the State Department for high-level planning and policy-making. Above, the main College building at Fort Lesley J. McNair, Washington, D.C. Much student work during the ten-months course is done in discussion groups, such as shown below.

proaches to the same problem, which are extremely stimulating. The net result of these lecturers, for the students, is an experience in adult education which cannot easily be duplicated any other place.

Each lecture normally lasts fifty minutes, after which there is a ten minute break which gives the students a chance to talk over what the lecturer has said. Then there is a half-hour period allotted for questioning of the lecturer by the students, and this period is sometimes more instructive and stimulating than the lecture which precedes it. Thus the question period plays an extremely important part in making the lectures an effective means of instruction.

Lectures are almost without exception scheduled in the morning only, with a maximum of two lectures per day and frequently only one. This helps to keep the students from getting fed up with lectures, and gives them time between doses to digest what they hear. Afternoons are available for committee work and study.

The committee discussion groups are utilized in three ways:

1. For group discussion of special selected topics, such as international atomic energy control, guided missile developments, etc., under the guidance of a faculty member or a guest authority on the subject.

2. For seminar work in developing a detailed knowledge of the relationship of the United States to other major powers. This includes the writing of a monograph by each student, which is the only individual work assigned the student.

3. For group solution of problems on strategy and foreign affairs. These problems require the students to solve many complex questions of which the following are typical:

Strategic concept of operations in a future war, and the logistical support thereof.

United States policy with respect to selected key areas throughout the world.

The implications of Greek-Turkish aid.

The future security of the United States.

All of these subjects involve extensive and sometimes heated discussions. Since the character of the work is on the highest policy levels there is no instruction in the usually accepted sense of the word. There is, however, as in graduate schools, assistance and guidance provided by the members of the College staff. Each problem finishes with the presentation of a few varying solutions to the entire class by committees selected by the faculty, at which time the committee solutions are picked to pieces by the rest of the class.

The problems prepared by the school for solution by the student committees are very briefly stated, but they take a week to a month of concentrated work for the committees to sweat out what they think is a reasonable answer. The last problem of the 1946-7 year is a good example of that. It consists of two mimeographed sheets; one and a half short pages of typing, double spaced. It contained just two basic questions—the nature of war up to 1960, and our national policy during that period. But their scope involves every conceivable field of military, political, economic and scientific knowledge on a global basis. And the ten days allowed for solution permitted only the broadest possible treatment by the students.

Class Organization

In order to give a better picture of how the committee system works, it is necessary to outline briefly how the class is constituted and organized. It is composed of thirty Army, thirty Air Force, thirty Navy and Marine, and seventeen Foreign Service and State Department officers. Each man is assigned a desk in a committee room, six or eight men to a room, with one or more representatives

of each service in each room so far as practicable. Room assignments are rotated about once a month so as to place each student in close working contact with as many other students as possible during the year. For group discussions and seminar work, the committees from two rooms may combine, or special sixteen-man committee assignments may be made, but for problem work the six-to-eight man committees are generally used.

This system of committee organization produces one extremely important benefit; namely, the broadening of all students by their close, working association with many experienced officers of other services having many diverse backgrounds. It also results in some prime inter-service "bull sessions" in the committee rooms, and these sessions are fully as instructional as the formal committee work.

Conduct of the Course

There are three points about the conduct of the course which stand out:

First: The College follows a policy of encouraging in the student absolute freedom of thought and expression. The College gives the student as much of the best information as he can absorb and then says to him, "You know the facts of life—now what are you going to do about it?" There are no "approved" solutions to any of the problems; the only solutions are those reached by the student committees.

Second: No student work is graded, and students are not given comparative ratings on completion of the course. Whatever rating takes place is in the opinions of fellow-students and of the faculty members as individuals.

Third: There is no attempt to put the student under heavy pressure. Little night work is necessary, but so much interest is aroused that many students do a lot of outside reading and study on their own initiative.

These three things develop a relaxed state of mind in the student which is highly important in two ways: first, it encourages a critical approach to all problems, which generates a maximum of initiative and constructive thinking on the part of the students; and second, the student has time to absorb, think over and evaluate the many ideas and the large amount of information presented to him. Any other attitude towards the students would detract seriously from the value of the instruction.

The United States has a fairly simple series of objectives in its international policy. Basically, these objectives are: First, to get the treaties of peace with our late enemies written so that they may go back to work and make their contribution to the restoration of normal trade and commerce; second, to strengthen and develop the machinery of the United Nations; third, through these two beginning steps, to secure for the world a stability which will enable men to address themselves to their daily tasks without the overhanging shadow and fear of war.

To carry out this policy it is a matter of first importance that the military power of the United States be kept vigorous, modern, and capable of swift mobilization.

Secretary of Defense James V. Forrestal

Establishment of the Fundamental Bases of Strategy

Dr. James Lea Cate, *University of Chicago*

This article, and a second article to be published in the December issue of the Military Review, *comprise Chapter 7 of Volume I,* The Army Air Forces in World War II, *edited by Wesley Frank Craven and James Lea Cate; printed by permission of The University of Chicago Press, Copyright, 1948.—The Editor.*

BRILLIANTLY executed though they were, the Japanese attacks of 7 December against Oahu and Luzon appear in retrospect as a colossal blunder. The perfection of those operations gave evidence of meticulous planning at the tactical level, but not of sound thinking along broader military and political lines. In fact, an analysis of postwar interrogations of high-ranking military and governmental leaders in Japan suggests that they had precipitated a major war without formulating for it an over-all strategy. Hopelessly out-matched in actual and potential industrial capacity, the Japanese had attacked with no firm pattern of operations in view and with no concept of how the war might be brought to a successful conclusion. There was some hope that if a formidable chain of island defenses could be thrown around the Inner Empire, American preoccupation with Germany and discomfiture over initial defeats might bring a negotiated peace, with Japan in uncontested control of the Greater East Asia Co-prosperity Sphere. Such a hope was, of course, based upon a most erroneous interpretation of American psychology.

Before Pearl Harbor the administration's foreign policy had been bitterly opposed by a highly vocal minority in the United States. This lack of agreement, perfectly consonant with our democratic process, might easily have been exaggerated by the misunderstanding of totalitarian leaders until it appeared as a paralyzing disunity. But among many of the isolationists the prospects of war with Japan had been less distasteful than that of war in Europe, and the very means by which the Japanese chose to open hostilities served temporarily to still dissident factions. When on 11 December Germany and Italy joined their Axis partner, the new U.S. unity was cemented; the almost perfect unanimity of the vote in the Congress on our declaration of war was symptomatic of the national temper. This did not mean that criticism of the administration's policies was completely hushed—within a month after Pearl Harbor the basic war strategy was under fire from intransigents in the press and in the Congress—but the nation as a whole began to gird itself for a war effort on a scale hitherto unprecedented.

If the national reaction to Pearl Harbor boded ill for the Axis powers, there was still little cause for early optimism in the United States. Indeed, the success of the Japanese attacks threatened momentarily to disrupt the whole trend of our strategic thinking. The plans which had

been worked out in collaboration with the British earlier in 1941 had been oriented toward Germany. The Tripartite Pact (27 September 1940) had strengthened the belief that Japan would join Germany should that nation go to war with the United States, but Anglo-American military leaders considered it possible to contain Japan by a strategic defensive until the defeat of Germany would allow full force to be applied in the Pacific. From 1938 the United States had invoked sanctions against Japan in the form of moral embargoes, but until summer of 1941 the administration had not been so outspoken in its denunciation of Japanese activities as of German. The President's radio address of 27 May 1941, announcing the proclamation of an unlimited national emergency, is indicative of this policy; it was most frank in its description of the dangers we faced from Hitler's government, but it contained no direct reference to Japan. To gain time for completing our defense measures, the administration continued to negotiate through normal channels with Japan until that nation began, late in July, to threaten southern Indo-China. A Japanese move in that direction would have isolated the Philippines and menaced both the Netherlands East Indies and lines of communication essential to the security of Great Britain itself. Immediately the United States began to stiffen its policy, and at the Atlantic conference in mid-August the President and Prime Minister agreed to act along parallel lines in warning Japan. From there on, relations between the United States and Japan steadily worsened until by 26 November they had reached a crisis. Hurried steps had been taken to reinforce American outposts in the Pacific, and by the British to improve the defenses of Singapore. In each case the efforts were limited in nature. To a large extent this was due to the as yet inadequate strength of the U.S. armed forces, to our matèriel commitments to England and the Soviet Union, and to the vast naval and military responsibilities which the British had elsewhere. But there was also an underestimation of Japanese capabilities both by commanders in the Far East and by leaders in Washington and London, and whatever alarm may have been entertained over Japanese threats toward the south, there seems to have been little doubt of the ability of the associated powers to implement the strategy described in ABC-1. *

The overwhelming strength of the Japanese army was recognized, but inasmuch as its southward movement must be by sea, we counted on neutralizing, if not wholly containing, that strength by Allied naval and air striking forces. Initial Japanese successes cut at the very roots of this concept. By 10 December, the enemy had destroyed or immobilized the heavy units of the U.S. Pacific Fleet, had sunk the newly arrived British warships *Repulse* and *Prince of Wales*, and had wiped out in large part our air strength in Luzon and Oahu. Manila and Hong Kong, already under attack, were doomed, and the drive for Singapore had begun. With their striking power crippled and their main bases rendered ineffective, the associated powers could offer little resistance as the enemy pushed on pell-mell for the Netherlands East Indies. The swift-

The decision to concentrate on Germany did not go unchallenged in the face of early Japanese successes, but it was a view long held by air planners and the most momentous strategic decision of World War II

* The study made by U.S. and British service staffs for military collaboration in the event of Anglo-American war against the Axis.

ness of that rush was hardly appreciated in the first few days of the war, but already it was obvious that prewar plans must be reviewed.

Meanwhile RAINBOW No. 5 *, as revised in November, was invoked—against Japan on 7 December, against Germany and Italy on the 11th—but with the proviso that Army task forces would be designated and dispatched only in accord with subsequent War Department instructions. Within the Air Staff there was an immediate, though momentary, reaction in favor of deploying all available air strength for defense of the Western Hemisphere and, if practicable, of Hawaii and the Philippines. Within a week, however, AAF planners returned to a more familiar theme with a new long-term design for offensive war. This plan, called AWPD/4 (15 December 1941) was hardly more than a restatement of the salient features of AWPD/1, with requirements somewhat inflated under the stimulus of war. It called for an air force of some 3,000,000 men and 90,000 planes, to be achieved by "giving NATIONAL FIRST PRIORITY TO THE PRODUCTION OF AIRCRAFT." This plan was not accepted. It was clear that the role of the AAF could be determined only in reference to the broadest national policies and that firm decisions on those policies must await further consultation with the British, whose declaration of war against Japan had come with ours on 8 December.

The need for close coordination of the efforts of all anti-Axis powers was recognized by the American government and its military leaders. During World War I, the Allies had achieved unity of civilian direction and military command only in the face of threatened defeat in the last year of the conflict; the lesson had not gone unheeded. In his request for a declaration of war against Germany and Italy, the President emphasized the need of "rapid and united effort" by all freedom-loving peoples in their struggle against the Axis powers. The Declaration of the United Nations, signed in Washington on 1 January 1942 by twenty-six nations, gave a pledge of mutual cooperation, but the significance of that document was largely political. The most concrete military measure took the form of bilateral agreements between the United States and the United Kingdom. These agreements, while of special import to the two principal parties, provided a workable means for coordinating the activities of the British Commonwealth of Nations and of certain governments in exile, through the influence of England, and of Latin-American republics and China through that of the United States. Collaboration with the U.S.S.R.—because of its geographical isolation, its neutrality toward Japan, and the absence of any tradition of intimate relations with the western powers—was to constitute a unique problem throughout the war.

The ARCADIA Conference: Over-all Strategy and Immediate Deployment

On 22 December, the press announced dramatically the arrival in Washington of Prime Minister Churchill, his chiefs of staff, and other high-ranking British officials. On the following evening, the British party met with President Roosevelt and his military and civilian advisors at the White House. The conference thus inaugurated, coded as ARCADIA, was in frequent session until 14 January. In his address to the Congress on 26 December, the Prime Minister declared that he had come "in order to meet the President of the United States and to arrange with him for all that mapping out of our military plans and for all those intimate meetings of the high officers of the armed services of both countries which are indispensable to the successful prosecution of the war." A more specific description of the business at hand was contained in a sug-

* The code name for the War Plans Division plan for an offensive in the Atlantic-European areas and a strategic defense against Japan in the Pacific.

gested agenda radioed by the British delegation en route on board HMS *Duke of York*. This called for: (1) a redeclaration of the fundamental bases of joint strategy; (2) the interpretation of the strategy into terms of immediate military measures; (3) the allocation of joint forces in harmony with the accepted strategy; (4) the formulation of a continuing program to raise and equip the forces called for in that strategy; and (5) the establishment of joint machinery for directing the war effort. In general, this preview may serve as a guide to the accomplishments of the conference. If some of the tasks were only partially achieved, a solid foundation was laid in each case.

The restatement of the basic Anglo-American strategy was at the same time both the most important of the tasks and the most readily completed. The British chiefs of staff early presented their views in a memorandum which, with slight revisions by the Americans, was approved on 31 December. The strategy thus accepted was, "in spite of recent events," essentially a reaffirmation of the principles of ABC-1. Again Germany was declared the chief enemy, the Atlantic and Europe the areas in which the principal efforts should be applied. The nature of the contemplated efforts was unchanged: defense of production areas in North America and the United Kingdom to insure realization of the Victory Program of munitions; maintenance of designated lines of communication, both sea lanes and air routes; forging and tightening a ring around Germany; weakening the Reich by indirect methods and by a concentrated bomber attack; and preparation for the eventual invasion of Germany. Meanwhile, in the Pacific only such positions should be defended as would "safeguard vital interests and deny Japan access to needed raw materials."

The determination to concentrate on Germany first was the most momentous strategic decision of the war, both in respect to the total effort and to the role of the AAF. Apparently accepted without dissent in the previous spring, that decision seemed less unimpeachable in the flood tide of Japanese successes. It was not to go unchallenged either within high military circles or in public, but it represented a view of the war which had long been held by the air planners and from which AAF Headquarters was never to deviate.

The translation of the accepted grand strategy into terms of immediate operations and allocations raised problems not so readily solved. Against the decision to concentrate first against Hitler, with all the priorities implied by that choice, was balanced the very pressing need for reinforcement of the Philippines and of other positions in the Far East. The limiting factor was not only—perhaps not principally—the number of troops available. The shipping shortage which was to remain a brake on projected operations throughout much of the war made impossible the immediate deployment of all those units which were trained and equipped for action. But in spite of the over-all priority given to the European war, some reinforcements had to be sent to the Pacific, and because of the immense distances involved in deploying troops in that area, it was only by adroit juggling of transport facilities that even barest necessities could be met.

One inevitable but ironical concomitant of the primacy given to the European theater was the knowledge that U.S. ground units sent in that direction were not destined for immediate combat. No major invasion of the continent was contemplated for 1942, though it was considered expedient to hold in reserve forces which might take advantage of any radical change in the situation. Hence it was that most of the movements and projects designed for the Atlantic-European theaters during the first half of that year were

those preparatory and precautionary deployments which had been set up in RAINBOW No. 5. The lesser movements to the Pacific bore, on the contrary, the stamp of urgency. Here it is sufficient to list briefly the points of issue and the decisions made.

The most considerable deployments in the Atlantic-European area were those which had been designated in the prewar plans for the British Isles and Iceland. The decision to substitute U.S. Army troops for U.S. Marines and British troops in Iceland and for the British garrison in Northern Ireland imposed severe demands upon combined shipping facilities. Each move, however, offered important advantages. Marines would be made available for projected amphibious operations, and British troops would be released for service in the Middle East, where they in turn would relieve Australian units needed for the defense of their own homeland. The movement of U.S. Army forces to Iceland had begun in August 1941, but because of the tight shipping situation that project was not completed by the target date of March 1942. The force set up for Northern Ireland was much greater than that stipulated in ABC-1. At Mr. Churchill's request, U.S. troops were to relieve British troops then garrisoned in Northern Ireland and were to be wholly responsible for the defense of that area rather than merely of U.S. bases there as previously agreed. This move, in addition to releasing British troops for service in more active theaters, seemed politically expedient in view of Eire's attitude toward the war. A new plan for this project, MAGNET, was approved on 11 January. It called for the dispatch of the V Corps (reinforced) plus air and supply organizations. The first sizeable contingent landed at Belfast on 26 January, but because of more immediate needs in the Pacific, the movement was thereafter retarded. The air contingent was not scheduled for movement until late spring.

The one European task force which was designed for early offensive action was the AAF bombardment force which, according to prewar plans, was to join the RAF in the attack on Germany. This project was approved informally at the first of the ARCADIA sessions, and reaffirmed on 13 January. The movement should begin "as soon as these forces and shipping become available." In view of the desperate need for aircraft and crews in the Pacific and for the expanded training program, immediate deployment was impossible. Current opinion that the initial heavy bomber groups might move out in March was to prove too optimistic.

A plan for movements within the Western Hemisphere adopted on 13 January involved for the moment less shipping. It was agreed that, subject to the consent of the Netherlands government, U.S. troops should replace British garrisons in Aruba and Curacao, and that the United States should continue to hold forces in reserve for the security of northeast Brazil against possible Axis thrusts.

The most ambitious project considered for the first half of 1942 was the joint occupation of French Northwest and/or North Africa. Before Pearl Harbor, the U.S. Joint Board had worked tentatively on plans for the seizure of Dakar (JPB BLACK) and Casablanca (GYMNAST) to forestall any German move toward the South Atlantic and South America. The British meanwhile had been thinking of a possible landing in Tunisia, and at ARCADIA the joint planners were directed to weld the two concepts into a single plan (SUPER-GYMNAST). In view of the many unpredictable factors involved in so complex an operation, and in view of the scale of effort required in terms of forces and shipping, no firm decision had been reached when the ARCADIA conference closed. Active planning for the operation continued throughout January and February. The plan was shelved on 3 March,

only to be revived in the summer in preparation for the invasion of November 1942.

Insofar as the Atlantic-European theaters were concerned, then, the Japanese attacks had done little to modify the strategic ideas of spring 1941, either in respect to over-all priorities or to specific deployments. In the Pacific the situation had been altered radically by the events of December; and, if the Anglo-American strategists were unwilling to forsake their basic concepts for the war against Japan, they had to re-examine the means by which those concepts might be put to test. Discussion by the Anglo-American chiefs of staff centered around three fundamental problems: a reconsideration of the nature of the strategic defense against Japan; the allocation of forces and shipping for that defense; and the establishment of an effective system of command over the widely scattered forces of the several United Nations. These problems were intimately related, and any ready solution was complicated by the whirlwind advance of the enemy, by the poverty of our intelligence concerning his intentions and capabilities, and by the primitive communications system upon which the widely scattered forces were dependent.

Eventual victory over Japan was contingent on the development of forward bases from which the heart of the empire could be hit. For the immediate future the best that could be hoped for was to maintain security of defensive base areas, to keep open the lines of communication, and to encourage Chinese resistance. Defense of the central and eastern Pacific areas devolved upon the United States alone. There seemed little likelihood of an attack in force upon the western coast of the United States, and reinforcements were available for Alaska and Hawaii. The most urgent requirement was for the Far East area, and on 31 December the Anglo-American chiefs of staff agreed on a general policy for that region. Essentially the plan called for a defense in depth of the Malay barrier, with air and naval forces operating in advance of that line to retard the southward drive of the enemy. Australia and Burma were to serve as the supporting base areas. To conserve shipping, supplies were to be found locally to the extent possible, but since the great bulk of forces and munitions must be brought from the United States and from England, additional arrangements had to be made to protect lines of communication from those countries and within the theater.

The task of providing reinforcements in combat units and additional supplies was not a simple one. In electing to concentrate Anglo-American efforts first against the Nazis, the chiefs of staff had accepted the corollary that "only the minimum of forces necessary for the safeguarding of vital interests in other theaters should be diverted from Germany." The pitiful inadequacy of Allied strength in the Far East made imperative, even under these restrictions, the immediate dispatch thither of such minimum forces. Even so, there was in Washington too little intelligence concerning the fluid tactical situation to justify firm commitments. The disposition of additional forces must hinge upon a number of contingencies—particularly upon the situation in Luzon, Singapore, and the Netherlands East Indies at such time as the reinforcements should arrive. Among the U.S. chiefs of staff there was a natural desire—prompted by humanitarian, strategic, and political considerations—to send aid to MacArthur's beleaguered army. In the course of the ARCADIA conversations, however, it became apparent that such assistance could not be sent directly to the Philippines. The exact day of that decision is difficult to determine, but before the conference closed it was accepted that the only hope was to channel reinforcements up through Aus-

tralia, and that hope grew progressively dimmer. In the absence of naval supremacy, there was little utility in planting ground force garrisons in the Malay barrier in spots which the enemy might easily by-pass. The string of island bases which constituted the vital but tenuous air link between Hawaii and Australia did require troops for local defense. New Zealand was assigned responsibility for Fiji, and Australia for the ultimate protection of New Caledonia; but it was necessary for the United States to provide a large ground force immediately for the latter island. Otherwise the prime necessity was for an early and substantial increase in air power—for local defense of the islands and for a striking force farther west. The AAF had—en route, at U.S. ports of embarkation, or earmarked for early dispatch to the Far East—a number of air units and about 400 planes. Actually the chief difficulty lay in the shortage of shipping rather than of aircraft or crews; for, whereas heavy bombers could be ferried out, lighter planes and their crews, ground personnel, and supplies must proceed by the slow water route. The need was so desperate that on 12 January the U.S. chiefs of staff suggested a review of the shipping priorities just established for the Atlantic. By reducing the size of convoys designed for Iceland and Northern Ireland and by reassigning the bottoms thus released, it was possible to find troop space for 21,800 men, including ground forces for New Caledonia and AAF personnel for the Far East area, and shipping space for the aircraft. This plan was adopted; it retarded troop movements in the Atlantic and the shipment of lend-lease supplies to Russia, but it provided minimum forces for immediate defense against Japan.

Even after reinforcements for the Far East had been allocated and shipping priorities established, it would be a matter of weeks before they could be brought to bear against the enemy. In the meanwhile, the Allied cause could be strengthened by a more effective utilization of the forces already in the theater. The command structure which had been prescribed in ABC-1 provided little more than a loose collaboration of American, British, Australian, New Zealand, and Netherlands forces dispersed throughout an area of millions of square miles. In the face of the numerical superiority of the enemy's forces and of the effective synchronization of his operations in widely separated regions, it was imperative that the United Nations improve their system of control. General Marshall on 25 December pointed out the weakness of the current command structure and proposed the establishment of a single unified command for the Far East area. There were objections of a practical sort which could be urged against any system which vested in one leader full control over the several arms of five nations, but the alternatives were so unpromising that Marshall's proposal was accepted. Because of the predominant British Commonwealth interests involved, the United States accepted as supreme Allied commander General Sir Archibald P. Wavell, whose appointment was announced on 3 January. His deputy commander and staff were chosen to give wider representation to air, ground, and naval forces of the interested nations. The directive under which Wavell was to exercise his powers was approved by the President and Prime Minister on 10 January. This document prescribed the relations which were to be maintained between the supreme Allied commander, the Anglo-American chiefs of staff, and the ABDA (American-British-Dutch-Australian) governments. Its specific provisions were not always to pass unchallenged during the early months of successive defeats, but as the first test of the practicability of a combined war effort, the ABDA command was of signal importance.

The solicitude of the chiefs of staff for the problems of the Southwest Pacific stemmed from the fact that they considered the enemy's amphibious thrusts in that direction as his principal effort. They were not blind, however, to the gravity of the situation in China. The American administration had long recognized the resistance of the Chungking government as an obstacle to Japanese expansion, and had encouraged Chinese efforts by loans and since 6 May 1941 by lend-lease aid. Later in the year the basis of aid had been broadened to include actual military support by the unofficial sanction bestowed on the American Volunteer Group (AVG) of combat pilots. Now, when Japan's new commitments in the Pacific should have brought hope to China, U.S. observers were finding that nation war-weary, her resistance weakening under pronounced material and moral deterioration. China's own productive powers were slight and communications with the western world so poor that it was difficult to bolster that weakness by grants of munitions. Isolated from the other United Nations in the Far East, China had not been included in the ABDA area; her armies were directed by Generalissimo Chiang Kai-shek, and coordination of effort must be effected by mutual agreement.

The United States, both from long-standing sentiment and for reasons of immediate military expediency, wished to continue and to increase China's war effort; if that effort in itself bore little hope of ultimate victory, it promised at least to contain large Japanese forces and to constitute a continuous drain on Japanese resources. To provide a broad basis for our desired policy of immediate assistance to China, the U.S. chiefs of staff presented a plan which was approved on 10 January. This entailed increasing the security and capacity of the Burma Road, and providing base facilities and technical services to the end that the Chinese combat operations might be made more effective. Specifically, the U.S. chiefs of staff proposed to appoint, with the consent of Chiang Kai-shek, a high-ranking military officer to act as the representative of the United States in China. He was to supervise lend-lease, to command (under the Generalissimo as supreme commander) all U.S. forces and such Chinese units as might be attached to them, and to control the Burma Road. Base facilities in Burma were to be made available through liaison with the British. This latter prospect introduced a command problem which was to complicate operations throughout the war. American forces in Burma, and later in India, had as a primary mission the promotion of Chinese resistance, yet geographically they lay in an area of British control. For the moment a solution was found by stipulating that forces under the U.S. representative would serve under the over-all direction of Chiang Kai-shek in China, but under the ABDA command in Burma. Experience was soon to prove this arrangement unsatisfactory, but in January 1942 it seemed to offer a practical compromise between conflicting national interests.

Providing the Forces

The immediate deployments approved at ARCADIA were calculated in terms of the modest forces then available, but the long-term strategy was based upon most ambitious requirements in trained men and matériel. Hence as a prerequisite to the success of that strategy, Anglo-American leaders must establish a "continuous program to raise and equip the forces" envisaged. To match in matériel strength the Axis powers, long on a war footing, would have called for great productive efforts, but the plans adopted at Washington went far beyond that goal. Traditionally, the American mode of warfare depended upon a generous use of matériel; we had preferred prodigality in that respect to prodigal wastage of human lives. With that

policy the British were in wholehearted agreement. Perhaps in both countries it reflected the democratic idea of the value of the individual citizen and the existence of a great industrial system, but with the British the policy was also a frank recognition of the overwhelming superiority in manpower enjoyed by the Axis and their satellite states.

In so huge a program as that contemplated the United States must play a paramount part. It must raise and equip tremendous forces of its own and it must contribute generously to the munitions needs of Britain, the Soviet Union, China, and other of the United Nations, Britain was to participate to the very considerable extent of her industrial capacity, but her industry was already strained and unable to provide for the nation's own needs in some categories, and there was the ever-present danger of a revival of large-scale German air attacks. Hence the greatest, though not the severest, burden fell upon the United States. In the long run the success achieved in the production program was perhaps as vital a factor in victory as any other, and in some items, certainly, it was a matter of quantitative rather than qualitative superiority over German industry and technology. An over-all history of the war should then be as much concerned with those who made the weapons as with those who used them. Here it must suffice to indicate briefly the measures taken to increase the flow of aircraft and related materials, to divide these weapons between the using air forces as accepted strategy dictated, and to increase the size of the Army Air Forces.

In production, as in military strategy, the policies inaugurated immediately after Pearl Harbor rested upon the solid foundations laid earlier. Under impetus of our own defense program, of foreign orders, and of lend-lease, the aircraft industry had increased its capacity and plans had been laid for further growth; machinery for allocations had long been in operation; and the Army Air Forces had been greatly increased in size. The chief need now was for an accelerated rate of expansion. A basic guide for this lay at hand in the Victory Program. In accepting AWPD/1, the Army Air section of that program, Secretary of War Stimson had qualified his approval by the observation that the plan would be practicable only if the nation were at war. Now that war had come, the whole of the national economy could be redirected toward the successful prosecution of military operations. As the President wrote Mr. Stimson on 3 January, "The concept of our industrial capacity must be completely overhauled under the impulse of the peril to our nation."

In its latest revision of AAF needs, AWPD/4, the Air Staff had requested an overriding priority for production of aircraft. This was not a practical solution; the fluctuating needs of a very complex war demanded a more flexible system. At ARCADIA, the Anglo-American planning committee suggested that, pending an early examination and revision of over-all needs by the military and of industrial capacity by civilian production experts, the Victory Program as it existed be taken as a basis for expansion. Rather than fix absolute priorities for the several categories of munitions, they wished to allocate resources for their manufacture in a sequence of limited schedules geared to the successive approved operations. For Army air needs, this would give precedence to heavy bombers for defense in this hemisphere and in the Pacific; and in the air assault on Germany, precedence over equipment for air support of a large ground force. The design for expansion suggested in AWPD/1 was not incompatable with those suggestions, and the air requirements of that plan, as revised in London in September, were adopted as the general guide for production.

On 3 January President Roosevelt sent Mr. Stimson a list of munitions, with a directive that he achieve the schedules contained therein and consult with the Secretary of the Navy as to allocation between the using services. No relative priorities were suggested. Aircraft goals were as shown in Table 1.

For 1942, this meant increasing existing schedules from about 46,000 to 60,000. The figures for 1943 differed slightly from those sent to Congress by the President on 6 January, which called for 25,000 rather than 31,000 trainers. In either case they seemed prodigious, especially in view of equally impressive requirements for ground and naval warfare. With any reasonably calculated rate of wastage, the annual production schedules of 60,000 and 131,000 aircraft should easily meet the requirements agreed on at London—about 60,000 combat and 37,000 training planes for the AAF and 21,000 for the U.S. Navy, plus the British deficit of 13,553.

At the suggestion of the AAF, the following schedule of allocations of combat planes was agreed on by the U.S. services, and approved by the President on 14 January (see Table 2). These figures included British contract and lend-lease orders, and since those were more numerous in Army-type planes, the division between the services was not as disparate as the table indicates. Allocation among the several United Nations was reserved for a fuller study of the problems involved.

For the present, however, there was need of an immediate adjustment in the allotment of planes according to current estimates of production rates. In each of the allocation agreements made or suggested before 7 December, the requirements of the AAF had been subordinated to those of the British. To the extent that such a policy had put tactical planes into the hands of an air force actually combatting the common enemy, it was justified. With the United States now in the war, however, that policy had to be revised to provide for the AAF's immediate combat needs and for its approved expansion.

The issue was raised at the beginning of ARCADIA, when on 14 December Admiral Harold R. Stark announced that in the future U.S. heavy bombers sent to the United Kingdom would be manned by American crews, and, when possible, be in organized units. Air Chief Marshal Sir Charles Portal pointed out that this was not in accord with previous arrangements, but he was assured by General Arnold that the proposal would not prejudice existing agreements, details of which were to be worked out soon. Those details were incorporated into the so-called Arnold-Portal Agreement, signed on 13 January 1942. The document listed by categories and by months the specific number of planes to be made available to Great Britain during 1942 from U.S. production. The totals called for 589 heavy bombers, 1,744 medium bombers, 2,745 light bombers, 4,050 pursuits, 402 observation planes, and 852 transports. Trainers were dealt with elsewhere. The allocations were to be subject to periodic readjustments when changes in attrition rates, in production estimates, or in planned deployments warranted reconsideration. The rigidity of this schedule appeared to some allocations experts sufficient to make the scheme impractical in the light of so many variable factors, but the readjustment feature was to be its saving grace. When in February 1942 the combined Munitions Assignments Board was established, the Arnold-Portal Agreement was accepted "for production planning purposes," and it served as a point of departure for later revisions. This agreement, it must be noted, was only bilateral. Existing commitments by each of the signators to other powers were still in force. For the United States the most important of these was the Soviet protocol, which remained the guide for

Aircraft Types	*1942*	*1943*	*Target Monthly Production*
Long-range, heavy, and medium bombers	11,300	30,000	3,000
Light, dive, and scout bombers	11,000	17,000	2,000
Pursuits	16,000	38,000	3,500
Observation and transports	6,700	15,000	1,500
Total combat	45,000	100,000	10,000
Trainers	15,000	31,000	
GRAND TOTALS	60,000	131,000	

TABLE 1.

deliveries in the U.S.S.R. until replaced by the Washington protocol in autumn 1942.

The increase in the number of aircraft scheduled for delivery in the AAF under the Victory Program called for a parallel expansion of the whole air organization. This meant an increase in the total troop basis, in the training program, and in the number of organized units. When war came, the AAF had an authorized strength of 348,535 officers and men. Its training establishment was geared to an annual rate of 37,000 pilots and 110,000 technicians. This training schedule reflected the needs of the 84-group program, which had been publicly announced on 23 October but accomplishment of which had been effectively blocked by the shortage of combat planes. Of the 84 groups authorized, 70 had been activated, but in many cases little had been done beyond formal activation. Relatively few of the groups were at table-of-organization strength in men, and few were fully equipped with modern aircraft. The Air Staff was faced with the problem of devising an orderly schedule which would provide aircrews and organized units at a rate which would synchronize with the accelerating flow of matériel. Only in this fashion could be created the balanced air force demanded by the strategic plans.

By 23 December 1941 the Air Staff had agreed on a broad pattern of expansion. During 1942 the AAF should accomplish its 84-group program, meanwhile speeding up its training schedule to match the Victory Program of aircraft production. In 1943 the AAF should organize and train the groups called for in AWPD/1 at normal (First Aviation) strength, and in 1944 at Second Aviation strength—that is, with an additional squadron for each combat group. Within a few days, the goal for 1942 was raised and a 115-group program substituted for the 84. General Arnold on 7 January apprised the Chief of Staff of the aims of the AAF and requested authority to put the new program into operation. Once having fulfilled "the immediate and

	1942			*1943*		
Aircraft Types	*Army*	*Navy*	*Total*	*Army*	*Navy*	*Total*
Long-range, heavy, and medium bombers	9,780	1,520	11,300	26,190	3,810	30,000
Light, dive, torpedo, and scout bombers	7,270	3,730	11,000	9,160	7,840	17,000
Pursuits	14,350	1,650	16,000	30,600	7,400	38,000
Observation and transports	3,430	3,320	6,750	12,260	2,740	15,000
TOTALS	34,830	10,220	45,050	78,210	21,790	100,000

TABLE 2.

necessary commitments for theaters of operations and task forces," he proposed to devote the major effort toward developing training facilities within the Air Corps. This would retard temporarily the rate of training in the Air Force Combat Command (AFCC), but once the program was in full swing it would relieve that command of all responsibility for individual and crew training and allow it to concentrate on operational unit training. Under the new arrangement Arnold proposed to reach an annual production rate of 50,000 pilots and 300,000 technicians by August and of 70,000 pilots and 500,000 technicians in 1943.

On 19 January the Secretary of War approved this program in a directive on expansion of the AAF during the calendar year 1942. The authorized strength of the AAF, including arms and services, was increased to 70,914 officers and 997,687 enlisted men. Approval was granted for activating during the year 45 additional groups of designated types. These were to be at First Aviation strength and with the 70 existing groups would round out the 115 called for in the new program. The AAF was also directed to expand training facilities to make possible the goals General Arnold had desired for 1942 and 1943.

Some steps were taken immediately to launch the new program. The Flying Training Command was established on 23 January under the Office of the Chief of the Air Corps, with full responsibility for training pilots and aircrews. The activation of approved units progressed rapidly; within two months some 30 groups had been added. The Air Staff, meanwhile, had already begun planning for a greatly augmented air force which could absorb in 1943 the tremendous flow of aircraft and aircrews. Just ten days after the 115-group program was authorized, the Chief of the Air Staff presented General Arnold with a plan for AAF expansion in 1943, recommending an increase of 109 combat groups. By 5 February this 224-group program had been accepted in the AAF as a basis for further study. The program was not formally approved until July, by which time several changes had occurred in the allocation of groups among the several combat types, and by September 1942 this schedule had in turn been supplanted by the 273-group program. But inasmuch as long-range allocation and deployment plans for some months after ARCADIA were based on anticipated forces of 115 groups by 31 December 1942 and 224 groups a year later, it is convenient to summarize here the unit status at the several pertinent dates:

Type of Group	*Aircraft per Group 1st Aviation Strength*	*Aircraft per Group Augmented Strength*	*Groups on Hand, 19 Jan. 1942*	*Groups Authorized 19 Jan. 1942*	*115-Group Program*	*Proposed Increase 1943*	*To be Attained by 31 Dec. 1943*
Heavy Bombardment*	35	55	14	20	34	32	66
Medium Bombardment	57	69	9	5	12	6	18
Light Bombardment	57	57	5	3	10	20	30
Pursuit	80	105	26	7	31	27	58
Transport	35	55	6	6	12	12	24
Observation	55	57	10	4	16	12	28
TOTALS			70	45	115	109	224

TABLE 3.

Instruction in Personnel Matters

Colonel D. H. Hundley, *Infantry*
Director, Department of Personnel

THE Army of the United States in World War II was the largest body of individual men and women ever to be assembled as an operating organization in the history of our country. Personnel problems of heretofore unknown magnitude and complexity confronted the personnel staffs in general and the G-1's in particular. Too few officers and civilians had the background and training necessary to cope with those problems.

In 1946, as a result of this experience, the War Department took a far-reaching step to provide this instruction in personnel problems by a reorganization of the course then conducted at the Command and General Staff College into its present pattern. A School of Personnel, along with others, was included in this organization. The designation "school" has now been changed to "department."

Many army officers of wide experience, and a number of outstanding civilian educators, worked on the curriculum. The college curriculum was divided into common and specialized instruction. Some 500 hours of a ten-month's course were devoted to personnel instruction. Approximately 350 hours of this was to be in specialized instruction where one-fourth of the students would concentrate on subjects of primary interest to G-1. This was a great improvement over the instruction given at the Command and General Staff College from 1920 to 1940 when only about eight hours, less than 1 per cent, of a nine-month's course were devoted to G-1 problems.

The department, initially, had great difficulty in preparing study assignments for the students because of the absence of texts dealing with the subjects taught. It was necessary in some cases to use civilian texts that were not entirely appropriate and in other cases to prepare Advance Sheets that could be taken home and read. The instructors of the Department of Personnel compiled "The G-1 Manual" primarily as a textbook for the College in 1947. It is now being widely used as a guide by staff officers and by students in other schools of the Army. The new 1948 edition of "The G-1 Manual" is now complete and available at the Book Department, Command and General Staff College.

Common Instruction

Instruction in the common phase now deals with the staff duties of the ACofS, G-1 in the division, Corps, Army and Communications Zone. A detailed list of the subjects taught would be too long to include here, but instruction is given on general staff duties required on:

Strengths, records and reports.
Discipline, law and order.
Prisoners of war.
Burials and graves registration.
Morale.
Military Government.

Procedures: classification, assignment, promotion, transfers, reclassification, re-

tirement, separation, training, and personnel economics.

Interior management.

Civilian employees.

Miscellaneous: administrative matters not assigned to another general staff section.

Specialized Instruction

The specialized phase has as its goal the preparation of students to serve as personnel officers on the staffs of the Department of the Army, overseas theaters, or zone of interior headquarters. It contains many subjects with incidental civilian, as well as the intended military, application. Others are purely military in their scope. Subjects, however, are intended to impress the officer student with the great differences among individuals and how to handle them best. Instructors also spend considerable time on the problems of handling personnel in mass and on the many details of staff work involved. Underlying principles are enunciated and stressed; reasons for their existence or change are considered.

Approximately 500 hours of personnel instruction are now offered during the ten-month's course of the C&GSC, to train the officers which World War II showed were needed in forming a vast modern Army

The subjects taught in the specialized phase deserve discussion individually. Although in this discussion only one paragraph is devoted to each subject, they are not of equal importance, nor is one subject completed before another is begun. Subjects are presented in sequence in accordance with their relationship to each other.

Applied psychology is studied at some length. This subject is now presented at the United States Military Academy and in all of the branch schools. Later, when graduates of the current advance courses at the Infantry, Artillery, and other schools come to the Command and General Staff College as students, this course will either be reduced in length or made more advanced. This course familiarizes the army officer with psychological terms and provides a basic understanding of the science of human nature. Many student officers have said, "That is what I did, but I didn't know why I was doing it." Others, "I wish I had had this instruction before the war; it would have made my command job easier." This course is designed to encourage a further study of the subject as well as to develop better appreciation of the problems of the individual.

Personnel management receives a good share of the time. It teaches techniques, policies and procedures that will assist the commander or staff officer in obtaining the most efficient utilization of manpower in peace and war. Another term for personnel management might be "good command technique." The commander, however, seldom has had the opportunity to learn about such subjects as tests, classification, assignment, and many others that are thoroughly taught in the Department of Personnel.

There were many instances during World War II, when figures were available in sufficient quantity to give the staff officer important advance information if he had been familiar with statistical techniques. Therefore a study of the science of statistics is in the course. It covers tabular and graphical methods of presenting numerical data, averaging, measures of variability, reliability, and correlation. The student is able to work simple statistical problems when he completes the course. More important, how-

ever, is the fact that as a commander and staff officer he will have a better appreciation of how to interpret the information at hand. Further, he will be able to converse in scientific terms with statisticians of the Army.

The Army has always appreciated the value of good administration. The ACofS, G-1 is charged with general staff responsibility for the administration of the headquarters and accordingly a course on the science of administration is included in the curriculum. This course covers the application of administrative methods to Army problems in large headquarters and deals with such principles as: determination of objectives, organization planning, coordination, direction and control. It examines at some length the organization and conduct of a high level conference. This is designed to disprove the common belief that administration is an uninteresting subject that is only concerned with instruction in methods of completing a form.

Regular Course, Specialized Phase, Department of Personnel, 1948-1949

Subject	*Hours*
Psychology	18
Personnel Management	29
Statistics	26
Administrative methods	22
Staff Studies	30
Observation and Reports	36
Military Government	20
Personnel, Peacetime Army	15
Manpower Procurement	38
Theater Replacements	20
Mobilization Planning	18
Miscellaneous	28

Some time is devoted to the making of staff studies. In this subject the student is given complicated and frequently contradictory information on a subject. He is required to present a staff report, in writing, to his superior designated in the problem. This practice in the preparation of staff studies according to a form used throughout the Army develops clear and logical reasoning from basic facts to arrive at proper conclusions and recommendations. Emphasis is placed on correct technique for rendering a short report with clear-cut recommendations. The best solutions are usually submitted on one well-written page with supplementary annexes.

Additional instruction in Military Government is given in the specialized phase. The ACofS, G-1 within a theater, has general staff supervision of all problems connected with civil affairs or military government. This instruction covers government organization, control, relations with command and civilian problems in various situations. Both historical and ficticious situations are used as teaching mediums. As many have said, this subject concerns all commanders and staff officers, not only the G-1.

Much time is devoted to peace and war phases of manpower problems. This includes exercises on personnel problems of the active peacetime Army as well as those of the civilian components. There are some realistic problems of mobilization planning wherein the Intelligence, Operations, and Logistics Departments work with the Personnel Department in coordination of background and subsequent developments.

Wartime manpower procurement and distribution are extensively studied, the instruction covering not only the multiple problems of the Army and Army techniques but the activities and techniques of the Navy and Air Force as well as those used by foreign powers. The manpower potential of our own and all nations is considered along with the characteristics of our population, and civilization. The effect of industrial needs on manpower is emphasized. Army personnel processing organizations, their activities, coordination and command are taught by a series

of applicatory exercises. This naturally leads into study of the organization for and methods of handling theater replacements, which is taught by a series of problems.

The specialized phase is concluded by a week of observation and reports. Students observe various outstanding industries in nearby Kansas City, Missouri. The class is divided into ten groups of about ten officers in each group. Each group spends two days with an industry looking over their personnel management technique. Questions as how the employees are hired, organized, rewarded, punished, controlled and supervised are typical of about a hundred such points the students check. A trip is also planned to observe a personnel center in operation. Upon return from his observation trip each student is required to submit an individual report and to participate in the preparation of a group report. The group reports are then presented orally to the entire class by a member selected from each group. In this way each student learns about other trips as well as his own and hears all recommendations made. Many suggestions are received for improvement in Army personnel management, but the main advantage derived is that the officer student sees and appreciates that industry, no less than the Army, pays a great deal of money and takes intensive interest in implementing the techniques the student has been studying during his entire course.

Since the reorganization described at the beginning of this article, the College has graduated two Regular and two Associate Classes. The students of the Regular Course have expressed themselves as liking the Department of Personnel instruction because everything taught has something to do with the handling of men, either individually or in groups. It is readily apparent to them that even though they may never become ACofS, G-1's the course will materially assist them as commanders, or as staff officers in sections other than the personnel section. The students of the Associate Course have shown great interest for the above reasons and because personnel management is fundamental to all organizations and obviously connected with their business in civil life. They feel that this instruction will make them more valuable as personnel technicians in civilian industry as well as in the Army.

It is too early to evaluate the effect of this instruction. Graduates have reported great progress because of their studies. Their superiors have indicated, without exception, that the officers who graduated are efficient on many varied assignments.

There is still much more to be done. Courses are being added to or changed as the need arises. The Command and General Staff College has made much progress in the instruction of future commanders and staff officers in the techniques of personnel management and realizes that there is still much to be done.

Fighting men are the one important commodity of which there is never enough and for which there is no acceptable substitute. Our national security demands that we make efficient and timely use of the manpower allotted us. Because time would be all-important if we were called upon to mobilize, our training requirements must be reduced to absolute essentials in time of peace, and our training methods must be rid of all lost motion.

General Jacob L. Devers

The Canadian Army Today

Lieutenant Colonel John D. Kenderdine, *Adjutant General's Department*
Editor, *Army Information Digest*

CANADA, in her national defence,* is like a well-coordinated athlete—lean, alert, and clean-muscled. Not being one of the major powers, she is not encumbered by occupation duties, nor is she weighed down with non-military tasks. She therefore can devote her energies and her military leadership to building a streamlined, hard-hitting military establishment. This she is doing, from the Ministry of National Defence down to her widely flung field forces.

The change-over period following World War II ended 30 September 1947. Demobilization was completed, wartime officers and men were selected to build up her Regular establishment; and she settled down to the clear-cut business of creating a new Canadian Army. She streamlined her military over-head, set up a series of Army colleges and schools, initiated a strong Reserve program—and reoriented her strategic plans.

Canada no longer looks only to the east and west in her defences; she now looks north, too. She is not panicky about the polar concept, realizing that the vast North Country can be only an area of slender outposts, radio and weather stations, and the like. Yet she realizes that, for the first time in her history, she lies between two powerful nations. One of them is friendly. "Our experience of more than one hundred years," states the Minister of National Defence, "shows that we are not going to be attacked by the United States."

The geographical relationship of Canada to the United States, with the population concentrated along her southern border, insures that she will never fight alone. And the sentiment of the two nations—Canada and the United States—expressed specifically by their leaders, underscores that assurance. In 1938, President Roosevelt stated that if Canada ever were attacked, the United States would come to her assistance; and Prime Minister W. L. Mackenzie King, in reply, stated that no nation ever would be permitted to use Canada as a bridge for attacking the United States.

Politically, Canada retains her independence of decision. She is bound to the British Commonwealth by ties of tradition and loyalty to the King, but is committed to no action in advance that will bind her to enter a war. Nor is there any political or military treaty or alliance between Canada and the United States; nothing that would impinge on her sovereignty. The ties of affection and respect that have bound the two peoples for a century are stronger than the rights, obligations, and penalties of formal legal documents.

There has been, however, an increasing awareness of a common military purpose. In 1940, a Permanent Joint Board on De-

* "Defence," the Canadian spelling, is used throughout.

fence (US-Canada) was set up, by executive agreement, "for the purpose of carrying out studies relating to sea, land, and air problems, including personnel and matériel, and to consider, in the broad sense, the defence of the northern half of the Western Hemisphere." The two nations cooperate in various ways, such as the mutual use of facilities and the experiments in cold weather testing. Neither country need proceed along these lines beyond its sound judgment; and when identity of interest ceases, the project comes to an end. Beyond that, there is no military commitment, either way; logic, community of interest, and ties of friendship will determine future action. These arrangements are in no way inconsistent with the charter of the United Nations, to which both countries are committed.

The Defence Structure

Canada probably has gone further than any other nation in knitting together, at the top level, an efficient and compact civilian-military defence team. None of the three services—Navy, Army, or Air Force—has its own secretary. The Minister of Defence works closely with the military heads of the services, either personally or through deputies. Policies of strategy, administration, personnel, research, supply, public relations, and finance are determined at this level, on the advice of various military and civilian committees.

The Minister of National Defence is The Honourable Brooke Claxton. He is a member of the Prime Minister's cabinet. Like the other cabinet members, he sits in the House of Commons where he participates in debate, answers questions which are addressed to the Government, introduces legislation that the Government desires and defends that legislation. Almost without exception, legislation is introduced by the Government. There are no Armed Services Committees, as in our Congress. Military legislation sometimes is referred to special committees, but in general is debated on the floor.

Mr. Claxton's personal staff includes a Deputy Minister of National Defence, responsible for the administration of the Department; and two Associated Deputies, one concerned with finance and supply, and one with personnel and pay matters.

At the top of the defence structure is the Defence Committee. This is a committee of the Cabinet and is concerned with national defence in its broadest sense.

Advising the Cabinet Defence Committee and the Minister is the newly created Industrial Defence Board, headed by an outstanding industrialist. The Board is charged with developing the industrial potential of the Dominion and preparing for industrial production in the event of war.

Next in the hierarchy—and at the top level in the Ministry of Defence—are (1) the Defence Council and (2) the Chiefs of Staff Committee. The Defence Council's function is to advise the Minister on administrative matters. It is in this Council that non-strategic matters of concern to the three services are threshed out and policies determined.

Whereas the Defence Council advises the Minister on administrative matters, the Chiefs of Staff Committee advises him in strategy, organization, training and other military matters. The Director General of Defence Research is also a member of this committee.

In the new streamlined Canadian National Defence structure, the Army has closely knit Active and Reserve Forces that are well schooled, effectively trained, ably led, and proud of their unit traditions

Other committees and services in the top echelon are:

Defence Research Board. This is, in effect, a fourth service, ranking in importance with the Navy, Army, and Air Force. It is headed by a distinguished scientist, whose status is that of a chief of staff.

Personnel Members Committee. This committee is concerned with personnel, medical services, pay, pensions and the like. One of its major concerns is to insure that members in the three services receive equal pay and privileges.

Principal Supply Officers' Committee. This committee deals with supply and equipment for the three services.

Inter-service Combined Functions Committee. This committee studies activities of the services with a view to effecting economies by consolidation, amalgamation, and cross-servicing.

The legal activities of the three services are centered at the top echelon, and the Judge Advocate General for all the services acts as adviser to the Chief of Staff. Public relations is in the office of the Minister of National Defence.

The strength of the three services is about 35,000, and that of the Army approximately 16,000. It is the present policy to bring the three services to only about 75 per cent of their authorized strengths. The Army's current goal is 18,175; which means that recruitment is needed for only about 2,175, plus a sufficient number to offset attrition. Normal Army recruitment, discounting recruiting campaigns, unemployment conditions, and other unusual factors, runs around 300 a month; with the rate of attrition from 175 to 200 a month; and a net gain of 100 to 125 a month. The Navy and the Air Force are practically up to authorized strength.

The Department of National Defence employs 19,783 civilians. Of these, 9,249 are rated civil servants, the others being "prevailing rate" employees.

The 1947-1948 budget for the Canadian armed services was $240,000,000. Of this, the Army was budgeted for $80,000,000; the Navy for $47,000,000; the Air Force for $60,000,000; and Research for $13,000,000. Nearly 10 per cent of the total—or $22,000,000—was earmarked for Reserve training, and a considerable portion of the operating budget of each of the three services also was devoted to the organization and training of the Reserve. The budget for 1948-1949 (the fiscal year began on 1 April 1948) is approximately the same as last year.

The Army

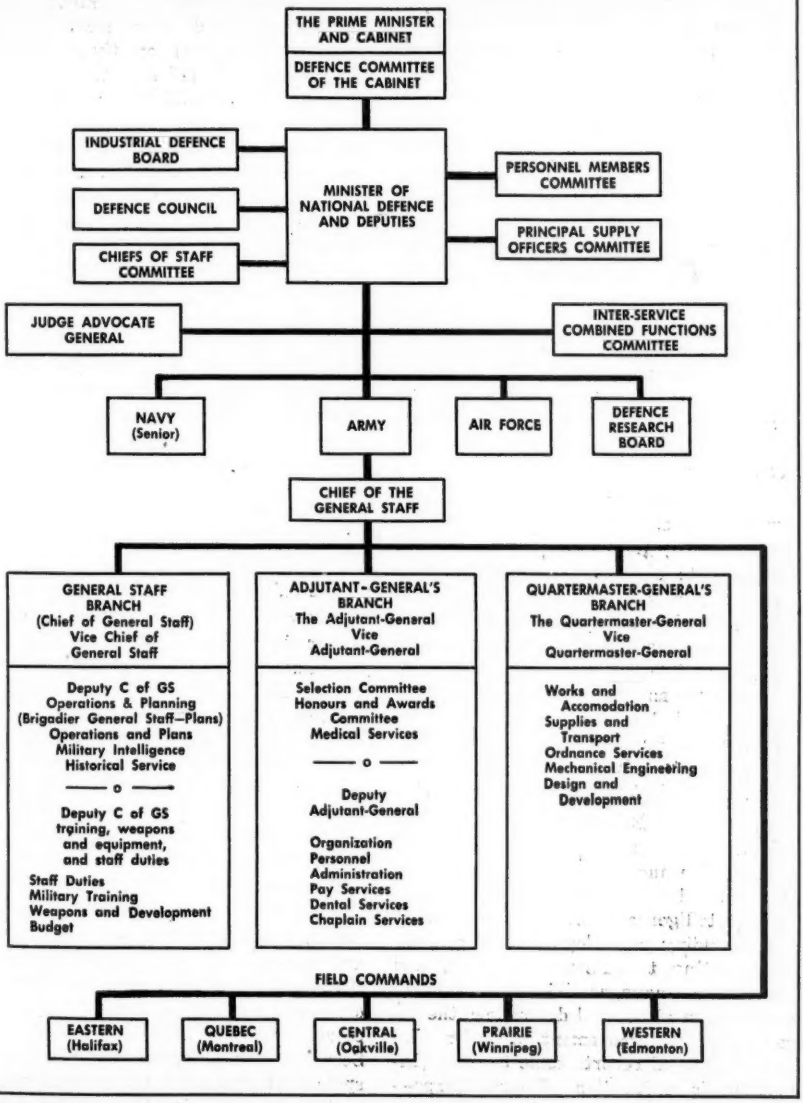
The Army consists of two major components—the Active Force (or Regular Army) and the Reserve Force. Canada has nothing comparable to the National Guard; all planning is concentrated on a single civilian component, the Reserve Force.

The Active Force is small, but is competently staffed, well-led and high spirited. Its officers and senior noncommissioned officers are seasoned fighters and made an enviable record in Sicily, Italy, Normandy, and Northwest Europe. They have the self-confidence and experience that make them ideal trainers for the new Canadian Army that is coming into being.

The staff organization of the Army has been streamlined into only three staff agencies: the General Staff Branch, the Adjutant-General's Branch, and the Quartermaster-General's Branch; representing, in general, the three major military functions—training and operations, administration, and supply.

The Army is headed by Chief of the General Staff Lieutenant General Charles Foulkes. The three staff divisions report to him; except that, on technical matters, the Adjutant-General's and Quartermaster-General's Branches may report to one of the ministerial committees or directly

CANADIAN NATIONAL DEFENCE AND ARMY ORGANIZATION.



to the Minister of Defence (or his deputy). In general, the staff organization of Army headquarters is duplicated in the headquarters of the five Army Commands. Each of the staff chiefs in Command headquarters may deal directly with his technical chief in Army headquarters, except on matters of general policy or on matters that concern more than one staff division.

The Chief of General Staff is responsible to the Minister of Defence on matters of military policy, including the organization, fighting efficiency, and employment of the Army. Strategy and planning and coordination with the Navy and Air Force come under him. He recommends the senior command and staff appointments. He is responsible for training of the Army and for its professional education. He prepares the Army budget. He is responsible for coordination of all three staff agencies.

The General Staff Branch also is the direct responsibility of the Chief of the General Staff, giving him a dual responsibility. Its direction, however, is delegated to the Vice Chief of the General Staff, a major general. The latter has two principal assistants, or Deputy Chiefs, one responsible for operations and planning (known as Brigadier General Staff—Plans), and the other responsible for military training, weapons and development, and staff duties. The Director of the Army Budget also is under him.

Under the Brigadier General Staff (Plans), operational plans are developed and the size and kinds of forces required in peace and war are determined. All military intelligence activities come under him, including psychological warfare, policies relating to prisoners of war, and training in languages. His office prepares mobilization plans, and determines the organization and movement of units. Inspector general reports come to him. (Inspection is a function of each Corps—arm or branch—Commander.) The historical section of the Army also is part of his office.

The Deputy Chief (for military training, weapons and development, and staff duties) is assisted by three Directors. The Director of Military Training is responsible for all military training, in collaboration with the directors of the various corps. He prepares tactical doctrines and manuals, is responsible for training establishments and the coordination of training courses. The Officers' Training Corps and Cadet Corps come under his jurisdiction for training purposes. Education in the Army, the Army Section of the Joint Services Film Bureau, and the Army Library system come under him. The Director of Weapons and Development determines the standards and kinds of equipment needed by the fighting forces, and also plans and supervises field tests. He works closely with the research and development agencies of the Dominion. The Director of Staff Duties is responsible for organization, order of battle, and mobilization plans.

The Adjutant-General is concerned with manpower—in the mass and as individuals. Under him come recruitment of enlisted personnel, mobilization, and formation of units. He is responsible for the classification of men and for the selection and commissioning of officers; for appointments, promotion, and retirement procedures. He is responsible for the administration of military law and for discipline of the Army. The Army Provost is under his jurisdiction. He is concerned with leaves and furloughs, welfare activities, health and morale of the troops, claims, regimental funds, funerals, graves, and prisoners of war. He is in charge of the pay services. He prescribes uniforms, order and precedence, honors, awards and ceremonials. The Medical Services, Dental Services, and Chaplain Services are responsibilities of the Adjutant-General, and he is responsible for the moral and spir-

itual welfare of the troops. He issues all administrative instructions, prescribes the movement of troops in Canada, and determines the needs in printing and stationery.

The Quartermaster-General is responsible for procurement of all supplies, including ordnance and engineering; for transportation; for construction (including port and railway facilities). He plans the general engineering requirements of the Army. He is responsible for the procurement and warehousing of food, fuel, and miscellaneous supplies. He operates the postal service and the food service. He is responsible for all travel and transportation by water or land. He is responsible for ordnance—not only for its procurement, storage, and issue, but also for its effective logistical use. He plans and supervises the mechanical engineering activities of the Army, including maintenance and repair of vehicles and of electrical equipment. He is responsible for design and development of engineer and vehicular equipment, and equipment pertaining to weapons, including radar, in consultation with the General Staff.

The three staff divisions of the Canadian Army, in general, comprise functions that rest with the five general staff divisions of the United States Army, and with The Army Comptroller. These three Canadian staff divisions incorporate, as integral parts, most of the functions of our Special Staff and our Administrative and Technical Staffs and Services.

A significant difference in the staff structure of the two armies is in the policy control and planning of the civilian components. Whereas our staff organization provides for a General Staff Committee on National Guard and Reserve Policy, and special staff sections concerned, respectively, with the National Guard and with Reserve (and ROTC) Affairs, the Canadian staff makes no special staff provision for these activities. There is no National Guard; and the responsibility for Reserve affairs is distributed functionally among the three staff agencies. Each staff agency is concerned with Reserve affairs equally with Active Force affairs.

The field organization of the Army also has been streamlined. Instead of eleven military districts into which Canada was carved before World War II, there are now five Commands. Each of these commands is organized to function as a division in the event of an emergency.

Eastern Command, with headquarters at Halifax, including the Provinces of Nova Scotia, New Brunswick, and Prince Edward Island—the Maritime Province.

Quebec Command, with headquarters at Montreal, comprising the Province of Quebec.

Central Command, with headquarters at Oakville (near Toronto), comprising the Province of Ontario.

Prairie Command, with headquarters at Winnipeg, including the Provinces of Manitoba and Saskatchewan and part of Ontario.

Western Command, with headquarters at Edmonton, including British Columbia and Alberta, the Northwest Territories and the Yukon—geographically the largest and most rugged of the Commands, stretching from the Pacific to Hudson Bay.

Responsibility for operations and the administration of the Army in the field is decentralized to the commanding generals of the five Commands. Each commander is responsible for training and mobilization of the Reserve within his command, as well as for all activities pertaining to the Active Army.

His responsibilities are tactical as well as administrative; he must be prepared to expand his headquarters organization into a division, or a succession of Reserve Force divisions.

The Canadian Army (Active Force) is largely engaged in training and administrative activities. It is the intention,

however, to create a small mobile striking force, divorced from routine duties and concerned only with its own effectiveness and its instant availability. In the interim, the present Active Force is so mobilized and located that it can be converted, on short notice, into a striking force in any part of the Dominion; or particular portions of it may be used, as the tactical situation demands. In the event of a national emergency, the Reserve Force, maintained, so far as it is organized, in a high state of training and equipment, would be available.

The Active Field force is organized as a brigade group. This battle force consists of three Infantry Regiments (each of battalion strength), two Armored Regiments, one Field Company of Engineers, one Field Artillery Regiment plus one Medium Artillery Battery, and one Antitank battery—together with units of Signals, Ordnance, Electrical and Mechanical Engineers, Medical, Army Service Corps.

Functionally the Army is organized into arms and services, which are known as Corps. Each Corps conducts training in its specialty at a Corps school.

The Reserve Force

Recruiting, organizing and training Reserve units is a major command responsibility; for, as one officer expressed it, "In the event of war, the Reserve Force is our army."

The Reserve Force is currently organized and trained at the battalion level. Many of the famous regiments of World War II are on a Reserve status, and recruiting is usually for a particular outfit. Many of the wartime officers and noncommissioned officers carry on in their units, forming a nucleus around which the new organization is built.

There are rigid physical and training standards for Reserve personnel, thus preventing fatty degeneration of the old-timers. Training requirements normally call for two nights a week during the autumn, winter, and spring months, plus a tour of summer camp duty. Certain types of specialists receive their summer training as individuals, taking 2-week to 4-week courses at military schools.

The Reserve officer is subject to a fine by a civil court for non-attendance at a formation.

An Active Force officer, with staff, is assigned to each Reserve battalion, and assists in its recruitment, administration, and training. His title is the Administrative and Training (A&T) Officer. His staff usually consists of a sergeant major, a quartermaster sergeant, and two or three noncommissioned instructors.

Ideally each Reserve unit will have an armory of its own; but pending the construction of additional armories, government and commercial buildings are leased. A 5-year construction plan calls for 250 new armories, and the modernization of 70 more.

Uniforms are issued to all Reserve enlisted personnel, to be kept in their personal possession. Weapons are kept, for training purposes, in the armories; and in the event of an emergency, enough individual and crew weapons are earmarked for each unit at a nearby quartermaster depot. The weapons storage policy calls for 100 per cent equipment in rifles and pistols; 25 per cent in automatic weapons; from 25 per cent to 50 per cent in artillery pieces; 10 per cent in B-type vehicles; and ammunition and other items according to schedules.

Reserve units are in various stages of organization and training. Training problems are many. Distances among subordinate units are great, making it difficult to build regimental solidarity. Summer training is handicapped by the absence of officers and men who are engaged in seasonal occupations, and some thought is being given to the establishment of seasonal camps. A major problem is the mainte-

nance of equipment because of the dearth of trained mechanics in the Reserve Force. Such problems may be inherent in any Reserve establishment. Canada is solving them, so far as they can be solved, by intelligent planning and persistent effort.

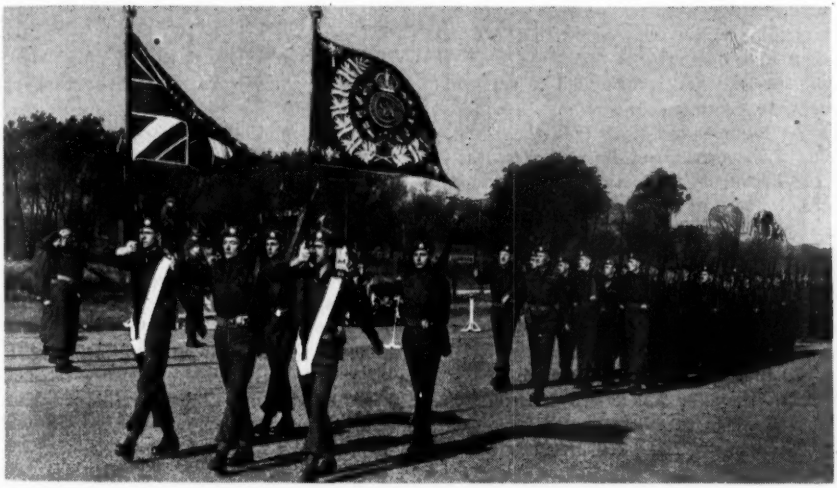
The mobilization objective of the Reserve Force is six divisions by 1952. The Reserve Force then would consist of: headquarters and corps troops for two corps, two armored divisions, four infantry divisions, plus two armored brigades, and four infantry brigades. The current strength is about 35,000 officers and men. There are many types of organized units, in varying degrees of training. Except for one in British Columbia, two in Alberta, and one in Manitoba, they are all south of the 55th parallel. The Reserve Force, in an emergency, is charged with providing coast defence and antiaircraft protection for Canada.

A not inconsiderable part of the Reserve Force strength lies in its Supplementary List. This consists of partially trained officers and men who are specialists, and of persons whose wide military experience or special abilities, regardless of age, will make them useful in an emergency, either as individuals or as nuclei for special types of service units.

The School System

The professional school system of the Canadian Army resembles that of the United States, although it is not so comprehensive. The National Defence College, at Kingston, comparable to our National War College and Industrial College of the Armed Forces, heads the list. The curriculum includes study of the major political, economic, and military problems of national defence. The course extends for thirty-one weeks.

A tri-service school, known as the Joint Air School, has recently been established at Rivers, Manitoba, for the training of officers of the three services in air-



The new peacetime Army of the Dominion of Canada is "small, but is competently staffed, well-led, and high spirited."

borne operations, ground-air coordination, and other mutual problems.

Training and research in problems of the Northland is given at the Combined Experimental and Training Station at Fort Churchill, on Hudson Bay, where the three services and the Defence Research Board carry on continuous studies. No school is operating at present for amphibious training, and all ranks are sent to the United States for this type of training.

The Army's top level school is the Canadian Army Staff College at Kingston, Ontario. It is comparable with the Command and General Staff College at Fort Leavenworth and is designed to train officers for command and staff assignments in the highest and next to highest echelons. The course extends over ten months—1,200 hours of instructional time and an equal amount of study time. Each student is required to submit three master papers, one each on some phase of training, administration, and quartermaster functions. Intensive preparation is required of each applicant for the Staff College. As much as eighty hours' off-duty time may be required in solving problems which are devised and graded by senior instructors in the staff branches of Army Headquarters. The applicant then takes an examination of six papers.

There are thirteen Corps Schools where soldiers attend courses in their specialties. In addition, a few officers are selected each year to attend Canadian universities for training in specialties not provided in Army schools; and a considerable number are sent for training to Army specialist schools in the United States and the United Kingdom.

Canada is unique in her system of training officer cadets at her service academies. The Royal Military College at Kingston, Ontario, and the Cadet College at Royal Roads, British Columbia, are integrated into a single educational system, known as the Canadian Services Colleges. Both institutions—at Kingston and at Royal Roads—are joint service institutions; and each trains prospective officers for all three services, and for both the Active Force and the Reserve Force. Upon admission to either college, the student agrees to serve as a commissioned officer in any of the three services, and in either the Active Force or the Reserve Force. By-products of the joint training are the friendships formed at the Colleges, that, in later years, make it easy for officers of the three services to work together.

The course at the Royal Roads Cadet College is two years in length; that at the Royal Military College four years. At the completion of the 2-year course, naval cadets of the executive and marine branches serve their remaining two years at sea. All others complete the 4-year course at the Royal Military College. Then, those who have been commissioned in the technical and engineering services of the Army, Navy, and Air Force receive an additional year, at government expense, in one of the Canadian universities, with a view to obtaining a university degree. Others receive no further academic training, but, as second lieutenants, are posted (assigned) to units of the Active Force; or, if they desire, to units of the Reserve Force.

During three summer terms of sixteen weeks each, cadets receive practical field training—at sea, at an air training base, or at the summer training installations of the Army. For summer service they receive pay and allowances.

Half the candidates for admission to the two Canadian Services Colleges are selected on a provincial quota, based on population; half are selected in open competition. In both instances, the candidate must have certain educational qualifications and must be recommended by his local board. The final selection is made by a Joint Selection Board at the top

Rigorous training is the order for both the Active and the Reserve Forces of the new Canadian Army, for in her defences Canada must look not only to the east and west, but across a vast expanse of sparsely-settled North Country. Above, soldiers undergoing radio training, one of the keys to control of the North. Below, a 6-pounder team.

echelon. Cadets (except those coming in from the Active Force) must pay tuition fees and cost of uniforms and necessary academic equipment. The age bracket at entrance is 16 to 20.

Canada's twenty-two universities, where a training program comparable to our ROTC is conducted, provide a second source from which officers are procured. The Canadian Officers' Training Corps is one of the strongest elements in the Dominion's defence. The program is on a voluntary basis; neither university nor student need participate. But it is the patriotic thing to do; and enthusiasm runs high.

Members of the Corps hold temporary rank as second lieutenants, although they do not normally exercise command, except within their own organization. They are subject to military law in their status as officers. They are paid as second lieutenants, pro rata, for their military duties. Summer training income, augmenting what they have received during the school year, goes far toward paying tuition and expenses.

The Government furnishes uniforms and equipment, and provides military instructors for the 3-year course. The curriculum during the earlier part of the first year is common to all arms; after this the student concentrates on the Corps (branch of the service) in which he wishes to be commissioned. All students must be studying for a degree.

During the summer months of the 3-year course, the student is posted to the installation of his chosen Corps for sixteen weeks. There he receives intensive field training, and has opportunity to command. Thus, at the completion of three years, the student has received not only theoretical military training but also a practical field course in leadership.

Upon graduation, his temporary commission is confirmed, and he may apply for appointment in either the Active Force or Reserve Force—if he has completed three summer tours. If he has completed only two summer tours, he goes into the Reserve Force.

North Country Activities

A glance at the map might indicate that complete security of the North Country would be possible only through a stupendous outlay of men and equipment. The Canadians wisely look upon all of Canada as a commander looks upon terrain which he must defend. By manning strong points and patrolling terrain of less strategic importance, control of a vast area is possible. Canada's strong points lie in the temperate zone, in general along her borders and seacoasts. The Northland she secures against surprise by conventional intelligence methods—patrols by the Royal Canadian Mounted Police, which periodically visit hamlets and trading posts; an air patrol; aerial photography; radar and radio; small groups of military personnel engaged in meteorological projects, equipment testing, and so forth; and the Canadian Rangers.

With Reserve units in readiness, with an Active mobile tactical force, and with a Ranger organization in the North Country, she expects to safeguard her sparsely settled frontiers against infiltration by a hostile power. A major hostile operation—or defence against it—is impractical, because the North Country takes most of one's effort for survival alone, with little left for combat.

The chief value of the Northland, both military and civil, lies in its expanse of undeveloped natural resources. The economic future of the Dominion as well as the development of her defence establishment depends to a large extent on the critical raw materials that lie in the North Country, and on the transportation and communications system necessary to exploit them. The northern program of the Dominion is, essentially, a civilian program, with the military cooperating.

Of major importance in the North Coun-

try are the experiments and winter training operations conducted at Fort Churchill. Fort Churchill, on the western shore of Hudson Bay, is known as the starting point of the famous Exercise *Musk-Ox*—a full-scale long range test, the first of the large joint Arctic exercises, engaging United States observers and equipment.

Musk-Ox was not a tactical exercise. It was a 3,000-mile trek, over the wastelands and barren stretches of the Far North, for the purpose of testing machines, clothing, equipment, and men—Canadian and United States. Starting on 14 February 1945, it stretched through eighty-one rugged days and wound up at Edmonton, Alberta, on 6 May, in the dust and heat of an early spring. Traveling by 5-ton snowmobiles, with heavily loaded American cargo sleds, the force of forty officers and men fought its way through fields of huge glacial boulders—often in unmapped country—across expanses of ice, across open water (with the Navy's help), covering as much as 150 miles a day when the going was good. The force was supplied by the Royal Canadian Air Force, by glider and drop. Advance parties of "cat" operators, radio operators, weathermen and airstrip technicians went ahead to prepare bases for supply from the air. All ranks learned how to live—and comfortably—in the extreme cold, how to drive and maintain vehicles in sub-zero weather, how to organize and strike a camp-site, how, in short, to live and fight in the Arctic.

The lessons of *Musk-Ox* and the other exercises form the basis of the curriculum of the Arctic Training School at Fort Churchill. Field exercises are continuous; every kind of weapon and equipment—both Canadian and United States—is tested continually. At one time or another, personnel from every Corps of the Canadian Army and from most of the arms and branches of the United States Army have been on duty at Churchill.

The Alaska Highway, part of the Northwest Highway System, is a maintenance responsibility of the Royal Canadian Engineers. It extends from Dawson Creek, British Columbia, to Fairbanks, Alaska—a stretch of 1,523 miles, of which 1,221 miles lie in Canada. It is a gravelled, all-weather road—difficult during the spring breakup and the autumn freeze. The Highway, in general, follows the line of the Northwest Staging Route, a chain of air installations maintained by the Royal Canadian Air Force. The telephone and telegraph lines along the Highway are part of a system stretching from Edmonton, Alberta, to the border of Alaska, where they tie in with the Alaska Communication System. They carry both commercial and official traffic, and several telephone and teletype channels have recently been leased to the United States.

Across the great northern expanse of Canada, below the Arctic Circle, stretches one of the Dominion's most important facilities—the Northwest Territories and Yukon Radio System. It was started commercially, and spottily, before World War I, to serve the fur traders, prospectors, and miners who were opening up the north country. The Royal Canadian Corps of Signals now operates the extensive network from Baker Lake, near the west shore of Hudson Bay, to Whitehorse, Yukon Territory, where the lines tie in with the Alaska Highway System, and thence to Alaska. At the eastern terminus, and through commercial feeders along the route, the System ties in with commercial lines of the Dominion. Through its awareness, twenty-four hours a day, of what goes on in the Northland, the System is an indispensable factor in Canadian defence.

Of major importance is the picturesque organization known as the Canadian Rangers. In a strict sense, it is not a component of the Canadian Army, but has the status of organized militia.

The Rangers are made up of trappers, woodsmen, miners, farmers, and others

who live in the sparsely settled parts of Canada. They perform services which cannot be performed by either the Active Force or the Reserve Force. Throughout the great stretches of Canada, along the west coast, across the Northland, and in the eastern Maritime Provinces, which could be actively defended by troops only at impossible cost in men and money, the Rangers keep alert for any enemy agents, saboteurs, or suspicious operations. They provide a fund of valuable background and current information about the wide-open spaces; and they serve as guides to the field forces in time of maneuver or war. In search and rescue work they are invaluable, assisting in locating and saving personnel and equipment.

The Rangers have an authorized strength of 5,000 (mostly organized into companies, platoons, and sections, with their own officers and noncommissioned officers. A platoon consists of not more than thirty men). They perform no drill or other routine duties; receive no pay; wear no uniforms, except brassards. They carry rifles, bayonets, and ammunition issued by the Army. They are recruited mostly from men who would not be available in a mobilization, because of age or other circumstances.

The Army's Heritage

The Canadian Army is deep-rooted in tradition—traditions born of the days when British units served in Canada and of later days when Canadian units served side by side with the British in the World Wars. These ties are sentimental, not legal, and are a strong morale factor.

Most regiments include the word "Royal" in their titles, and many are named after members of the Royal Family. An even closer tie is the affiliation of Canadian regiments with regiments in the mother country. The Canadian units adopt the mess customs of their parent outfits, and frequently wear distinctive parts of their uniform.

Such customs are the hallmarks of the Canadian Army and are deep-rooted in the national tradition. The man in the street knows the Canadian regiments and speaks of them with pride. The emotional tie that binds the Dominion to the mother country is a strong one; yet it represents no silver cord relationship; it in no degree excludes a deep, friendly feeling for the United States; or admiration—not envy—of the power of the United States and of the moral courage of our people in assuming the risks of world leadership.

I firmly believe that the only prescription for absolute security for any nation, including our own, is international understanding and cooperation.

General of the Army Dwight D. Eisenhower

Air-Ground Intelligence Cooperation

Lieutenant Colonel M. O. Perry, *Field Artillery*
Instructor, Command and General Staff College

RECIPROCAL exchange of enemy information between air and ground units is of vital importance to each in accomplishing its operational mission.

"Tactical (visual) reconnaissance reports 20 plus tanks scattered in field vicinity Q4898." — "An increase in trenches, road blocks, gun positions, AT ditches and pill boxes on the VOSGES-BELFORT GAP line is noted by photo interpretations" (a product of photo reconnaissance) — "250 railway fuel cars were observed at KAISERSLAUTERN and GRUNSTADT by tactical reconnaissance pilots." — "Photo reconnaissance located the movement south of two trains of medium tanks on the FRANKFORT-KARLSRUHE line."

Reports such as these were typical on all fronts during World War II, and were used by ground commanders and intelligence officers to assist in completing a picture of the enemy. General Patton emphasized their value when he said: "Air reconnaissance has successfully provided Third US Army with timely and accurate information of the enemy and has been of inestimable value to all units of this command." This remark, and similar comments by other commanders, establishes the importance to ground units of information collected by air intelligence agencies.

Likewise, such information collected by ground intelligence agencies is of value in obtaining the best employment of the tactical air forces' effort. For instance, the interrogation of a prisoner of war disclosed the location and productive capacity of several underground Junkers aircraft factories, as well as their type of overhead protection. A captured map furnished the exact location and armanent of the enemy antiaircraft defenses in the HALLE-LEIPZIG area; and a clandestine agent reported the presence near BORDEAUX of 15,000 enemy troops who were crossing over to ROYEN in barges and cargo boats.

This article deals primarily with the means employed to collect and disseminate air reconnaissance information to ground units.

Important advances were made in the technique of air reconnaissance during World War II. Major General O. P. Weyland, who commanded the XIX Tactical Air Command which operated jointly with the Third US Army in Europe, made the following statement: "Although air reconnaissance operations and procedures in general have followed lines laid down long ago, many important lessons have been learned and new techniques evolved under battle conditions." Let us consider these

Both air and ground units benefited greatly from reciprocal exchange of enemy information in World War II. Particularly in the field of air reconnaissance, important advances in techniques were developed

important recent advances at the army-tactical air force level.

Air-Ground Intelligence Organization

Air-ground intelligence cooperation is largely governed by the air-ground intelligence organization (Figure 1). You will note that the ground component of this organization includes three echelons—division, corps and army. At the division level, the chief of the photo interpreter team or other personnel designated by the assistant chief of staff, G-2, functions as the G-2 Air representative. In addition to supervising his team, the acting G-2 Air prepares and forwards the division's requirements for aerial reconnaissance to corps. He also assists in the dissemination of air reconnaissance information. In turn, the corps G-2 Air considers the divisions' requests for visual and photo reconnaissance with those of other corps units, and then transmits a consolidated request to army. As at the division level, the corps G-2 Air disseminates air reconnaissance information, and is assisted by the photo interpreter teams. At the army, or the highest ground echelon included in Figure 1, we note that the first direct G-2 Air contact is established with the jointly operating tactical air force.

The G-2 Air subsection of an army intelligence section operates in three locations: one in the G-2 section, another with the A-2 in the tactical air forces' joint operation center, and a third at the army photo interpretation center. Some of the functions of this subsection include: combining corps requests for aerial photography and visual reconnaissance with army requirements, the forwarding of the army's total request to the tactical air force, and the dissemination of the resulting information. Additional responsibilities include supervision of the ground liaison officers at the reconnaissance group, and the army photo interpretation center, which are shown on the left of Figure 1.

Air-Ground Intelligence Organization

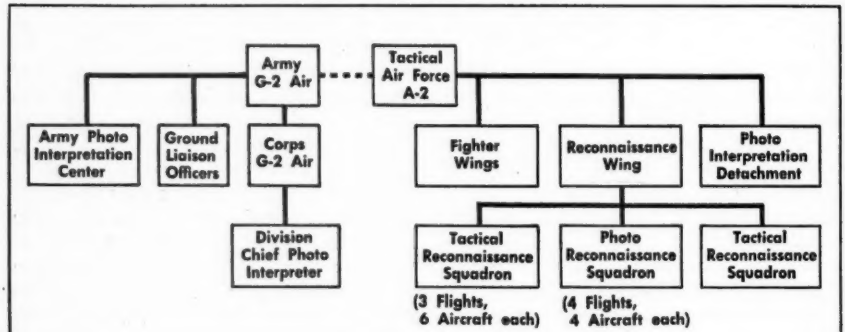


Figure 1.

The ground liaison officers (GLOs) are the army G-2 Air's representatives who are attached to the reconnaissance group. These officers assist air unit S-2s in briefing pilots prior to their mission on the ground situation and also on desired information. Upon the pilots' return, the GLOs assist in questioning them. The information thus obtained is transmitted to the army G-2 Air for dissemination to ground units.

A second agency which requires supervision by the army G-2 Air is the army photo interpretation center (APIC). In

Europe during World War II, this center consisted of an administrative headquarters detachment plus from six to twelve photo interpreter teams. Present plans to improve APIC include a proposed table of organization for an aerial photo interpretation and reproduction company, consisting of a company headquarters, an interpretation platoon, a reproduction platoon, and a service platoon. The company headquarters performs administrative, operational, communication, library and records functions, while the interpretation platoon is charged with interpretation of photos, and the collation of the resulting intelligence. The reproduction platoon prints and packages photos for ground units; and the service platoon includes sections for supply, mess, and maintenance. An over-all total of 230 officers and enlisted men, including twenty-nine photo interpreters, is recommended.

Next, let us examine the right side of Figure 1, or the agencies of the tactical air force which provide information to ground units. First are the fighter wings. Information of enemy activities which are observed by fighter pilots is processed by air unit S-2s and reported to the A-2. It is also submitted to the army G-3 Air by his GLOs with these units. A second agency that furnishes intelligence to the A-2 is the photo interpretation detachment. It studies photos of planes on enemy airfields in order to assist in determining air order of battle, and also reports other air force targets which are of interest to ground troops. These targets include antiaircraft positions, bridges, air fields, radar sites and supply installations. Additional information is also available to the A-2 from adjacent tactical air forces and from the next higher air force headquarters or the tactical air command.

However, the principal air intelligence agency in the tactical air force is the reconnaissance wing. It consists of two tactical reconnaissance squadrons of three flights of six planes each, and one photo reconnaissance squadron of four flights of four planes each. These two types of squadrons ably complement the work of each other as is brought out in considering their characteristics.

Air Reconnaissance Capabilities

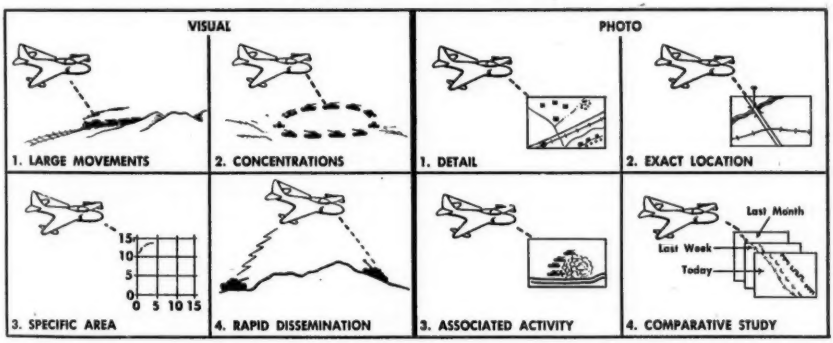


Figure 2.

Air Reconnaissance Characteristics

Tactical or visual reconnaissance can best observe large-scale enemy troop movements and concentrations (Figure 2). It can effectively search a specific area either by means of planned missions or by radio instructions while airborne. It is capable

of effecting rapid dissemination of information, since the pilot can transmit an urgent report of an enemy activity as soon as he sees it. Still another valuable feature of visual reconnaissance is its ability to adjust long-range artillery missions.

Photo reconnaissance, on the other hand, furnishes relatively much more detailed information of the enemy. Frequently by means of resection, enemy locations can be determined to the nearest ten yards. The results are much more accurate than when merely estimated by a tactical reconnaissance pilot. Then too, the interpreter can study the photos and

Air Reconnaissance Limitations

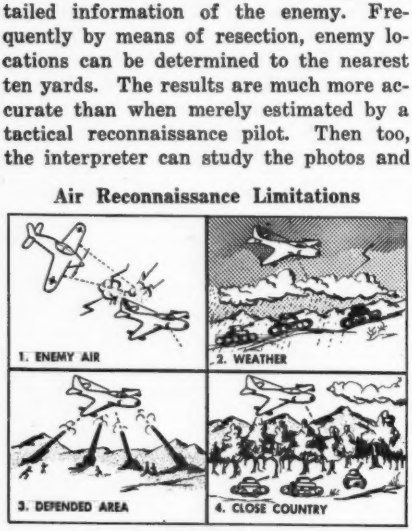


Figure 3.

determine likely enemy locations from such associated signs as trail marks, slashings and blast marks. Finally, photo reconnaissance supplies a means of studying any given area over a considerable period of time and consequently of being able to ascertain any changes in enemy installations.

The same general limitations are common to both tactical and photo reconnaissance to a marked degree (Figure 3). Enemy air defensive measures interfere with photo reconnaissance less than with visual reconnaissance, since sorties of the former are normally flown at higher altitudes or very close to the ground and are aided by greater speed in avoiding aerial combat. Weather naturally affects both types of air reconnaissance effort to the same degree. Close country or wooded areas are disadvantageous to both visual and photo reconnaissance. Although careful study by photo interpreters may reveal more information than would be noted by tactical pilots. Additional limitations for visual reconnaissance lie in the facts that the pilot is observing from an airplane flying from 300 to 500 miles per hour, that he must orient himself on a small scale map, and that a part of his attention will be required in operating his plane and watching for enemy planes. The greatest disadvantage of photo reconnaissance—and it is not indicated in Figure 3—is the considerable time required for processing the photos—that is, for developing, printing, locating the area of the photo on a map, and interpretation. This, of course materially delays dissemination of the derived information.

This discussion of air reconnaissance limitations is intended in no way to detract from the intelligence value of this agency. On the contrary, it is emphasized that in the final analysis air reconnaissance has ably demonstrated that it can supply the type and quantity of information which ground commanders prize highly.

Air Reconnaissance Plans

A third point that will assist in a better understanding of air-ground intelligence cooperation is to have some knowledge of the plans devised to obtain pertinent information from air reconnaissance. Examples of both visual and photo reconnaissance plans used by the Third US Army in Europe during December 1944 are included in Figure 4.

The visual reconnaissance plan which is superimposed over the army zone of advance is represented by a grid consisting of squares approximately thirty miles on a side. The squares are numbered to facilitate area identification. The figures

in parentheses denote the number of missions flown daily in an area. In the example in question, these missions total forty-eight, or many more than can usually be expected, since the normal number of missions furnished by two tactical reconnaissance squadrons is from eighteen to twenty. In the given situation, however, the tactical air force operating jointly with Third US Army had an additional tactical reconnaissance squadron attached, and, due to the extreme need for visual reconnaissance, the absolute maximum number of missions was flown. An additional point to be noted is that missions assigned to search in area twenty-one can be given routes to observe while flying over areas one and eleven, both enroute to their search area and on the return flight to the air field. In this way, additional visual reconnaissance is obtained in the closer-in areas.

Besides the search of areas in the zone of advance to a depth of about 100 miles, other visual missions are assigned to route reconnaissance to a depth of 200 to 300 miles. These missions check the principal railroads and highways in front of the army in order to determine enemy supply routes and to note movement of enemy reserves. At times, photo reconnaissance planes are used for these distant missions, and photo strips are taken of the important railroads and highways.

The photo reconnaissance plan indicated in Figure 4 represents the combined photo requests of the Third US Army. The wide strip along the front includes the area for daily front line cover or photography which extends approximately ten miles in depth behind the enemy front. This photography has a scale of about 1/10,000 and each photo has the 60 per cent overlap necessary for stereo study. Other daytime photography includes "pinpoints" or large scale photos of certain areas. The narrow rectangles near the front are the areas in which oblique photos are to be taken. Oblique photos are used by infantry units in checking and designating routes of approach, phase lines, and objectives, and by artillery units in designating and locating targets. Other photo requests are for night photo missions. They usually are "pinpoints" of communication bottlenecks such as bridges, cross roads, and railroad switching centers.

Both the photo reconnaissance and the visual reconnaissance plans which are prepared by an army G-2 Air represent the total requests of the units with the army. These plans are submitted to the tactical

Air Reconnaissance Plans

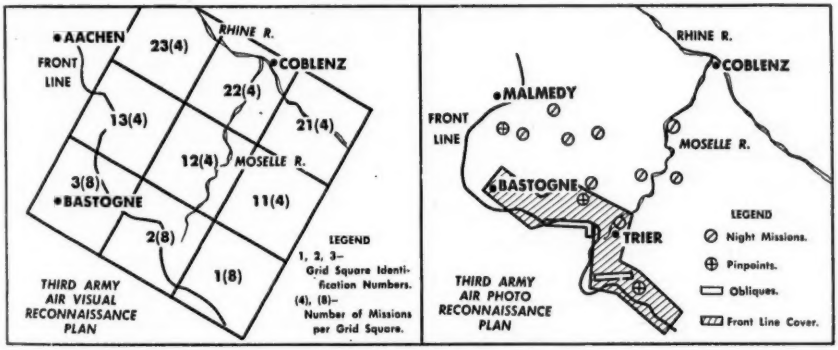


Figure 4.

air force operating jointly with the army. The A-2 then consolidates the tactical air force reconnaissance requirements with those contained in the plans of the army G-2 Air. When the combined air and ground requirements exceed the available air reconnaissance effort, the A-2 and army G-2 Air must coordinate such adjustments as are necessary.

Dissemination

The means of communication usually made available to air reconnaissance for dissemination of information consists of

G-2 Air Radio Nets

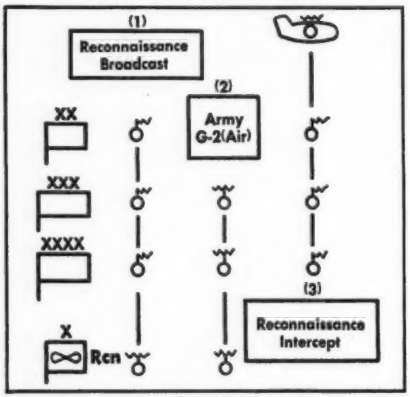


Figure 5.

wire, radio and courier. Wire communication, when available either as teletype or telephone, is employed to transmit urgent information from GLOs and APIC direct to the unit concerned, or to the army G-2 Air, who in turn disseminates the information by means of the G-2 Air channels. In a fast-moving situation when wire communications may not be available, two of the radio nets shown in Figure 5 can be employed to disseminate both visual and photo reconnaissance information.

Net (1) is called the reconnaissance broadcast net. The transmitting station at the reconnaissance wing broadcasts periodic reports which are assembled by the senior GLO. In Europe during World War II, these reports were transmitted hourly and were copied by receiving stations at army, corps and divisions. The army G-2 Air net (2) includes stations at the corps, army, and the reconnaissance wing and is used to transmit battle information. The reconnaissance intercept net (3) transmits urgent visual reconnaissance information direct from the pilot in flight to the net control station at the joint operations center. Since there are listening stations in this net at divisions, corps, and army, they too receive the information. Couriers are employed to deliver daily mimeographed intelligence reports from the GLOs and APIC, and also photographs to the requesting units. APIC has liaison planes for this service when weather permits, and motor vehicles as a substitute during inclement weather.

Summary

Four factors are pre-eminently important in gaining a working knowledge of air-ground intelligence cooperation. They are: the organization to implement the desired cooperation, air reconnaissance characteristics, air reconnaissance plans, and the communications system for disseminating the resulting information. Each of these factors contributes materially to the attainment of the objective of air-ground intelligence cooperation: the continuous two-way flow of information between air and ground units.

Our future security depends on American willingness to combat unceasingly the conditions that provoke war, and on our readiness to defend America and its principles should war break out despite preventive measures.

General of the Army Dwight D. Eisenhower

Research, Development and Standardization

Lieutenant Colonel J. Shacter, *Infantry*
Instructor, Command and General Staff College

IN the event of a future war it will be vital that our limited manpower be equipped with the latest and mightest advances of science and technology. Recently, the Congress of the United States has considered at great length the expansion of the armed forces and the part which research and development will play in such an expansion. It is the intent of this article to briefly summarize the current organization for research and development in this country and in the Department of the Army and to discuss the procedures of standardization in the production of an item for military use.

Phases of Activities

Research is a continuous process of scientific investigation prior to and during development. Research may be grouped into either basic research or applied research. Basic research is theoretical and results in increased scientific knowledge and the discovery of new phenomena, principles or laws of science. It is not usually related to any specific end-item or product, but impetus may be provided to research by the suspected possibilities of new matériel or techniques, as in the research of nuclear energy which resulted eventually in the atomic bomb. The present research on cosmic rays falls into this classification. There is no immediate, apparent, practical application, but the future may bring some.

Applied research is directed at a practical, useful end. As an illustration, basic research led to knowledge of the principles and laws on nuclear fission. There was the possibility that such a reaction, if harnessed, could create a powerful military weapon. Applied research then was sought and all efforts and energy were canalized towards this objective—the control of atomic energy. The possibilities of such use for specific military purposes, which had become apparent through applied research, were then investigated. Investigation led to development.

Development is the application of known scientific facts to the creation of new or improved matériel, techniques and countermeasures for military use. As a result of development, we secured the atom bomb. Development is still going on with that weapon to produce an improved bomb—one of greater destructive force that can be handled and stored with greater impunity and ease.

Correct procedures of research and development lead to standardization. Standardization is the determination or selec-

Since they are an essential of the national strength, our research, development, and standardization activities require civilian and military supervision, time to accomplish, and peacetime perfection

tion and use of the best design, quality, method or process for performing a desired function. The standardization of an item follows a fairly definite procedure, which includes engineering tests of a pilot or experimental model, followed by service tests, modification, and adoption. These phases will be discussed in detail later.

Civilian Organization

Chart 1 shows the civilian agencies currently functioning. The National Academy of Science was founded during the Civil War by Act of Congress to be an official advisor to the government on scientific matters. The National Research Council, the operating agency of the Academy, was organized at the request of President Wilson in 1916 to assist in organizing the scientific resources of the country for fighting World War I. The purpose of the Council is to stimulate research in the sciences and to apply science in the strengthening of the national defense. The Council serves as a means of bringing into active cooperation the scientific and technical services of the Armed Forces with American and foreign civilian technicians and scientists.

The Atomic Energy Commission was established by Congress on 1 August 1946, by the Atomic Energy Act of 1946, to develop and utilize atomic energy for public welfare, to increase the standards of living, and to promote world peace—subject at all times, however, to the paramount objective of assuring the common defense and security of the country. The Atomic Energy Commission has a Military Liaison Committee with a representative from each of the Departments of the Army, Air Force, and Navy. This committee advises the Commission on all matters of atomic energy relevant to military applications. This provides the armed forces with a proper voice in the development, storage, control, and use of atomic bombs and fissionable material.

The National Advisory Committee on Aeronautics was established by Congress to "supervise and direct the scientific study of the problems of flight." In 1939 the President made the committee the consulting and research agency for the Joint Aeronautical Board.

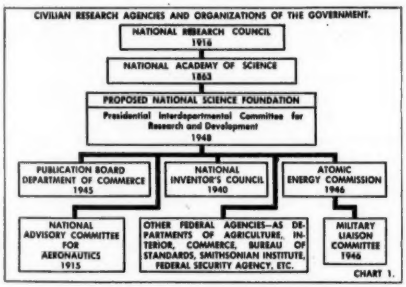
The National Inventors Council was established in 1940 for the purpose of examining and evaluating proposals and inventions applicable to military uses. Inventions deemed of value are referred to the appropriate service agency. Since its inception in the early days of World War II, over 210,000 ideas and suggestions have been evaluated by the Council, and more than 8,600 referred to the Armed Forces for test and study. Up to the present, a total of 110 have been adopted for use.

The Publication Board, Department of Commerce, was established in June 1945 by Presidential Directive with membership derived from various governmental departments. Its purpose is to collect and disseminate to civilian science and industry the great volume of technical reports acquired from former enemy countries during the war, as well as those resulting from research by governmental agencies.

In addition to those discussed, there are many other agencies operating under a wide range of government bureaus in the Departments of Agriculture, Commerce, Interior, Treasury; and in the Smithsonian Institution, the Federal Security Agency, the National Bureau of Standards, and others.

Although the National Academy of Sciences has performed effective service, there is need for more authoritative coordination between research agencies of the government and those of industry and civilian science as was provided by the wartime Office of Scientific Research and Development and the National Defense Research Council. This country urgently needs an official agency of science to supervise and foster science on a national

scale. The Armed Forces especially are desirous to see such an organization come into existence in order to coordinate science with the needs of the military. One agency would then coordinate and mobilize the efforts of all scientific research and development in the United States. The present Research and Development Board under the Secretary of Defense cannot do this. To fill this need there is pending in Congress a bill to establish a National


CIVILIAN RESEARCH AGENCIES AND ORGANIZATIONS OF THE GOVERNMENT.
NATIONAL RESEARCH COUNCIL 1916
NATIONAL ACADEMY OF SCIENCE 1863
PROPOSED NATIONAL SCIENCE FOUNDATION
Presidential Interdepartmental Committee for Research and Development 1948
PUBLICATION BOARD DEPARTMENT OF COMMERCE 1945
NATIONAL INVENTOR'S COUNCIL 1940
ATOMIC ENERGY COMMISSION 1946
NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS 1915
OTHER FEDERAL AGENCIES—AS DEPARTMENTS OF AGRICULTURE, INTERIOR, COMMERCE, BUREAU OF STANDARDS, SMITHSONIAN INSTITUTE, FEDERAL SECURITY AGENCY, ETC.
MILITARY LIAISON COMMITTEE 1946
CHART 1.

Science Foundation, directly responsible for coordinating and promoting scientific research in the United States. It would be the senior scientific organization in the country with all other agencies attached or subordinate to it.

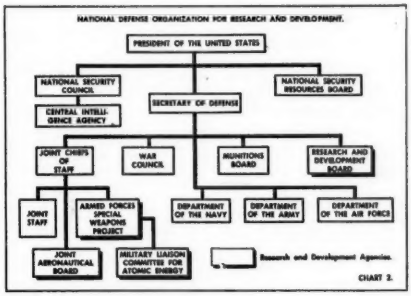
In January 1948 the President established the Interdepartmental Committee for Scientific Research and Development to make all the scientific agencies work together and to keep the President informed. The principal duties of the committee are to coordinate federal research, recommend new projects, and keep in touch with non-government scientists through their professional societies. It will probably serve as a temporary committee until the National Science Foundation is established, and provides the only control and supervision of civilian research agencies at the present time.

National Defense Organization

Chart 2 shows the National Defense Organization for Research and Development. The National Security Act of 1947 established the Research and Development Board. The Board is a coordinating group for the Departments of the Army, Navy, and Air Force and advises the Secretary of Defense on the status of scientific research relative to the national security. The Board has a civilian chairman, Dr. Vannevar Bush who was the director of the war time office of Scientific Research and Development.

The Joint Aeronautical Board was established for the purpose of securing coordination between the services in the development of aviation. It investigates, studies, and reports upon all questions affecting jointly the development of military aviation.

The Armed Forces Special Weapons Project (AFSWP) was established on 31 December 1946 as a joint Army-Navy-Air organization to discharge all military *service* functions relating to atomic energy. It



was established simultaneously with the turnover of the Manhattan Engineer District to the Atomic Energy Commission. The project (AFSWP) furnishes members to the Military Liaison Committee of the Atomic Energy Commission.

Department of the Army

Chart 3 shows that the Director of Logistics, in addition to his other functions, is the advisor to the Secretary of the Army and the Chief of Staff on all matters relating to research and development.

To assist him, the Director of Logistics has the Research and Development Group under the Deputy Director for Research and Development.

Implementation of the Research and Development program of the Army is the function of the Technical Services and is the responsibility of each Technical Service chief, who has a research and development section and specialized technical committee in his staff. Under the Technical Services there are many research and development facilities scattered throughout the United States, totaling about ninety. Each Technical Service conducts research and development on items peculiar to its service and on items designated by the Department of the Army. Coordination between the interested arms and services is accomplished in each Technical Service by the Technical Committee to which the project is assigned.

The Office, Chief, Army Field Forces, is responsible for initiating, through its Development Section, requirements for the research and development of items of equipment in which the combatant arms have primary interest. As the major using agency of the Department of Army through its training responsibilities, AFF is responsible for the bulk of the service testing with its four Test Boards.

When General Henry S. Aurand, now Director of Logistics, was Director of Research and Development for the Army, he classified the various research and development agencies into four levels, as shown above.

Science Organization	SCIENTIST	Level
(National Science Foundation) Atomic Energy Commission National Academy of Science Nat'l Advisory Com Aeronautics Smithsonian Institute		Statesman or Presidential
Research & Development Board Bureau of Standards National Inventors' Council Cabinet Activities—Agriculture, Commerce, Interior, Labor etc.		Cabinet
R & D Group—Dept of Army Office of Naval Research D C of S for Matériel—Air AFSWP Joint Aeronautical Board		Strategist
Technical Services—Army Test Board—AFF Technical Bureaus—Navy Air Matériel Command		Tactician

This concise classification shows the scientist to be at all organizational levels. This is correct and very appropriate, since the scientist and engineer play a part in conceiving the idea, proposing the research, developing the item, advising in the use of the item, and finally even in observing the results on the battlefield.

Standardization Procedures

Now that the organization for research and development has been briefly outlined,

DEPARTMENT OF THE ARMY RESEARCH AND DEVELOPMENT ORGANIZATION.

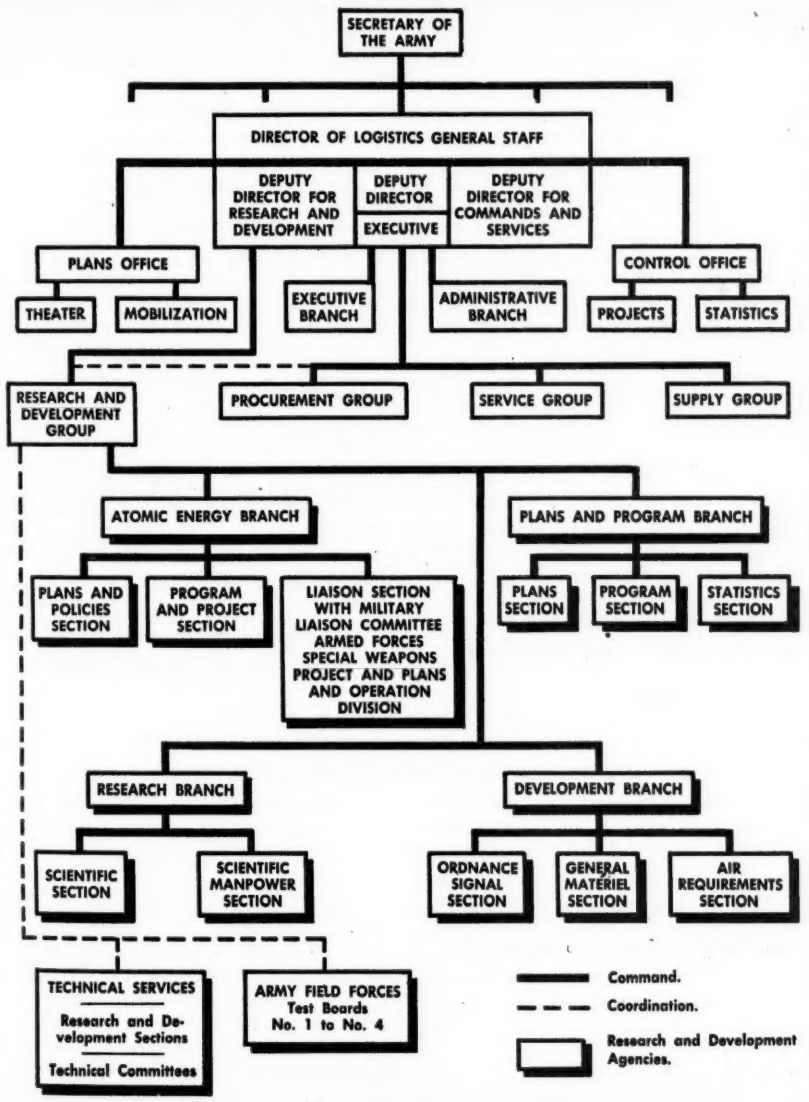


CHART 3.

let us take up the steps involved in the standardization of an item from the time the idea is submitted until procurement is initiated. Chart 4 illustrates these steps.

The idea for a new or modified item of equipment may originate with any individual or agency within or outside the Department of the Army and very often is the result of the Technical Services Employee Suggestion Program, such as was true for the M-1 Garand rifle. Mr. Garand, an employee of the Ordnance Department, conceived the idea and assisted in the development of the semi-automatic rifle which bears his name. Many individuals submit proposals, suggestions, or inventions through the National Inventor's Council, where they are evaluated. The using troops themselves develop many of the new ideas. The ideas, from whatever source, are then submitted to the using agency—that is, the Army Field Forces or the Technical Services of the Army for coordination, approval, estimations of requirements and determination of military characteristics. This data is then submitted to the Research and Development Group, Division of Logistics, for review and referral to the appropriate developing agency or Technical Service for action by its Technical Committee. This committee, which has representatives from all agencies interested in the items (including the General Staff), renders a report on the item. If approved by the committee, a classification and priority designation will be assigned the item for development.

Project officers of the Technical Services then begin work on a preliminary design and initiate development according to the approved plans. This work may be done by contract with a commercial firm, and much of the development is done this way. Existing items, either military or commercial, are examined with a view to possible modifications to meet the military characteristics required. Adopting commercial items with the fewest practicable modifications is followed wherever possible. It is essential that adaptability to mass production and effect on strategic materials be considered in the designing.

After the design is completed, a mock-up or model built to scale is constructed to determine obvious deficiencies in design before the pilot model is constructed.

When the designs and models are satisfactory, a pilot or working model is constructed by the development laboratory or the commercial concern. Changes are made to improve the design or facilitate the manufacture of the item in quantity. To the extent practicable, the pilot model is made from standard components.

The pilot model is then subjected to a series of engineering tests to determine suitability of design from an engineering standpoint. Liaison officers of the using agencies should be present during the tests to render assistance and advice from the user's point of view. If the engineering test is unfavorable, the item is modified or redesigned, or a recommendation may be submitted to give no further consideration to the item.

If the engineering test is satisfactory, the developing agency may request that service tests be conducted by the using agency. Service tests determine adequacy and practicability for use prior to adoption. Requests for service tests are forwarded to the Division of Logistics, General Staff, which in turn directs the appropriate using agency to conduct the service tests. In the Department of the Army, this means the AFF or a technical service. The Service Board, as one of the AFF Boards, conducts the tests and prepares a report giving factual data, conclusions, and recommendations. The chief of the using agency reviews the report and forwards it to the Division of Logistics with recommendations for adoption, modification, further test or cancellation. If adopted, the item is classified as standard or substitute standard

RESEARCH, DEVELOPMENT, AND STANDARDIZATION PROCEDURES IN THE DEPARTMENT OF THE ARMY.

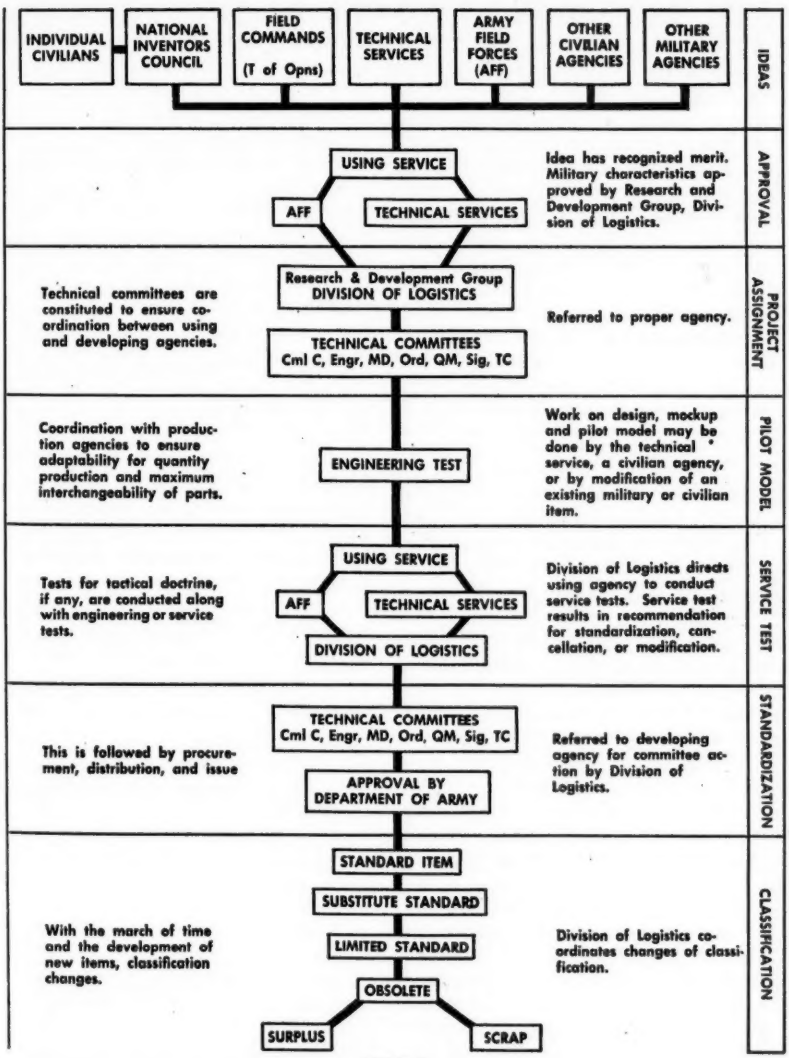

INDIVIDUAL CIVILIANS
NATIONAL INVENTORS COUNCIL
FIELD COMMANDS (T of Opns)
TECHNICAL SERVICES
ARMY FIELD FORCES (AFF)
OTHER CIVILIAN AGENCIES
OTHER MILITARY AGENCIES
IDEAS
USING SERVICE
AFF
TECHNICAL SERVICES
Idea has recognized merit. Military characteristics approved by Research and Development Group, Division of Logistics.
APPROVAL
Research & Development Group DIVISION OF LOGISTICS
TECHNICAL COMMITTEES Cml C, Engr, MD, Ord, QM, Sig, TC
Technical committees are constituted to ensure coordination between using and developing agencies.
Referred to proper agency.
PROJECT ASSIGNMENT
ENGINEERING TEST
Coordination with production agencies to ensure adaptability for quantity production and maximum interchangeability of parts.
Work on design, mockup and pilot model may be done by the technical service, a civilian agency, or by modification of an existing military or civilian item.
PILOT MODEL
USING SERVICE
AFF
TECHNICAL SERVICES
DIVISION OF LOGISTICS
Tests for tactical doctrine, if any, are conducted along with engineering or service tests.
Division of Logistics directs using agency to conduct service tests. Service test results in recommendation for standardization, cancellation, or modification.
SERVICE TEST
TECHNICAL COMMITTEES Cml C, Engr, MD, Ord, QM, Sig, TC
APPROVAL BY DEPARTMENT OF ARMY
This is followed by procurement, distribution, and issue
Referred to developing agency for committee action by Division of Logistics.
STANDARDIZATION
STANDARD ITEM
SUBSTITUTE STANDARD
LIMITED STANDARD
OBSOLETE
SURPLUS
SCRAP
With the march of time and the development of new items, classification changes.
Division of Logistics coordinates changes of classification.
CLASSIFICATION

CHART 4.

and incorporated into the Army Supply Program.

So much for standardization procedures. Each item does not necessarily go through all stages. New major items will. The next step is the computation of requirements for the Army and other agencies for which the item is to be procured. Then comes procurement. The Division of Logistics assigns the procurement project to the appropriate Technical Service, which is usually the service which developed the item. Before the item reaches the using agency it goes through the successive steps of procurement, receipt, storage, and, finally, issue. All these steps, especially procurement, will be subjected to limitations and priorities—in peacetime, budget limitations; in wartime, priorities dictated by availability of raw materials and production facilities.

Classification Changes

Starting its life of usefulness in the service, the item is issued as a standard or substitute standard item, according to allowances prescribed in pertinent Department of the Army publications. Standard-type items are the most advanced and the most satisfactory that have been adopted, and are preferred for procurement. Substitute standard-type items are not as satisfactory as standard items but are accepted as substitutes, and may be procured to supplement the supply of the standard item. As new and improved items are developed, a standard item will pass into the substitute standard, limited standard, or obsolete classifications. A limited standard item is one which may be in use or available for issue to meet supply demands, but since it is not as satisfactory as the standard or substitute standard item no additional procurement of the major item is made; but spare parts may be procured throughout a reasonable life expectancy of the major item. The Division of Logistics approves changes in classification. Once an item is classified as obsolete it is declared surplus and sold, or scrapped.

Our standardization procedures should carry over from the field of development and production into those of specifications, procurement, cataloguing and nomenclature. If we attain standardization in these related fields, which currently the Munitions Board is trying to do, then we shall be able to achieve greater speed in any possible future military and industrial mobilization. Standard specifications, procurement, cataloguing, and nomenclature would result in decreased inventories and greater availability and interchangeability of items. From all aspects, standardization can help tremendously not only in diminishing military cost but in making military operations easier to conduct.

Conservation of our natural resources demand that our armed forces have no duplication, or dissipation of efforts, and no competition among themselves. We must have a unified, coordinated system for research, development and standardization so that the facilities, resources, and personnel available will be most economically used.

Summary

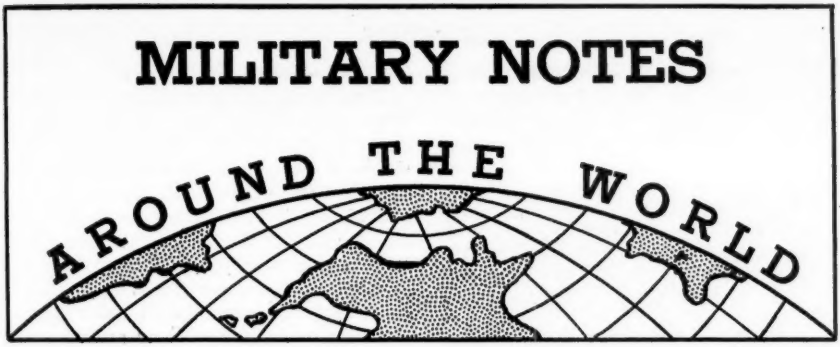
(1) Civilian and military agencies are required to supervise continuously our research, development and standardization procedures so that the most practicable and economical results will accrue.

(2) Even under the most favorable conditions, considerable time is required from the realization of the need for an item to its development, test, standardization, production and delivery.

(3) Our procedures must be prefected during peacetime.

(4) The entire nation, including Congress, the taxpayer, and the Armed Forces, must realize that our research, development and standardization activities represent an essential element of our national strength.

MILITARY NOTES AROUND THE WORLD



CANADA

Arctic Medical Problems

There are no human diseases inherent in the Arctic. Certain human afflictions are more prevalent in the Arctic than in temperate areas and other afflictions prevalent in temperate areas are non-existent or unknown in the Arctic. The Eskimos are unusually susceptible to normal white men's diseases, since the native population does not have the natural immunity to common diseases that the white man possesses.

One of the most dangerous afflictions with which Arctic inhabitants have to contend is carbon monoxide poisoning. Although the physiological reactions to carbon monoxide poisoning are no different in the Arctic than the reactions in temperate areas, the Arctic does offer greater opportunity for exposure to this form of poisoning due to the extensive use of heating equipment in confined quarters.

Frostbite is caused when the temperature is allowed to interfere with circulation. Minor frostbite on the face can normally be treated by simply placing the bare hand on the frozen spot, allowing the heat of the hand to thaw the tissue. In more serious cases, the frozen part should be warmed very slowly. Under no circumstances should snow be rubbed on a frozen portion of the body. Since infection of damaged tissue can result from frostbite, a clean dressing should be properly applied to damaged tissues to reduce the chance of infection. Massage of damaged areas should be avoided since it is likely to lead to further tissue damage.

Exposure is caused by the lowering of the entire body temperature with no resultant local damage. Too rapid warming of an exposure case may result in shock to the patient. As in more serious cases of frostbite, the patient should be warmed slowly.

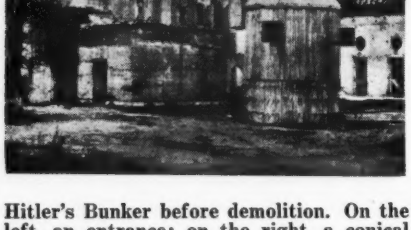
The common cold exists in the Arctic when men living under normal conditions are moving in and out in the performance of their duties, and are coming in contact with a number of people. However, colds are unknown among men who have been on the trail, away from sources of infection, for two or more weeks.

Snow-blindness is caused by the direct reflection of the sun's rays from the snow. The exact physiological action which takes place to produce the symptoms of snow-blindness are not definitely known, but the affliction is characterized by extremely painful headaches and stiff and painful joints. Snow-blindness is prevented through the use of good sun glasses.—*Canadian Army Journal.*

GERMANY

Destruction of Hitler's Bunker

Soviet troops in Berlin have blown up the air-raid shelter on the grounds of the Reich Chancellery in Berlin, where

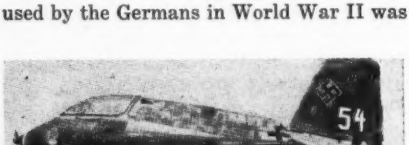


Hitler's Bunker before demolition. On the left, an entrance; on the right, a conical ventilation and observation tower.

Hitler spent his last hours before the fall of the German capital. The underground fortress contained thirty rooms, including living rooms, kitchen, offices, a conference room, and a power house.—*The Sphere*, London.

Rocket Plane

Another advanced type operational plane used by the Germans in World War II was



the Messerschmitt *Komet*. It was used as an interceptor fighter. Power was furnished by a single Walter HWK 109-509A-1 bi-fuel, liquid-rocket unit.—*The Aeroplane.*

German Atomic Bomb

The German scientist Heisenberg, winner of the Nobel prize in the field of physics, recently revealed the progress the Germans had made in their atomic research. Before the war, German scientists had almost lost interest in this problem and for a long time the small number of laboratories they possessed constituted a serious handicap for them. Also, they committed the error of choosing heavy water as moderator of their atomic piles, a substance produced in quantities only by the Norwegian hydro-electric plants. The sabotage of these plants during a commando raid slowed their labors. (The Americans abandoned the use of heavy water, and their first atomic piles were equipped with graphite of a high degree of purity.) Moreover, the Germans were not able to obtain the enormous quantities of uranium which were required.

Then, too, atomic research in a Germany which was feverishly preparing a large number of secret weapons was not on the same scale as the Manhattan Project, and the funds allowed for it have been estimated to have been only one-thousandth of those of the Anglo-Saxon budget.

In spite of this handicap, the Germans were on the point of operating an atomic pile, which the Americans seized on 22 April 1945, in an underground shelter near the village of Heigerbach, fifty kilometers from Stuttgart. This uranium battery had been constructed by Dr. Heisenberg for generating energy to operate engines. It is true, however, that it is a long way from the construction of an atomic pile to the construction of an atomic bomb. The scientists of the Manhattan Project required two and a half years to cover that phase of the development. In 1942, the German scientists believed that they would require at least two years to develop an atomic bomb but were not given the go ahead signal.—*L'Armée Française.*

AUSTRALIA

Defense Research

The Australian Cabinet has decided to create a special sub-committee to study the effects of ordinary bombs, flying bombs, rocket projectiles and atom bombs. Its duties will be to advise the Government on the latest developments of warfare in these fields.

Special monetary awards for the discovery of radioactive minerals in Australia have been approved. These range from $3,200 for the discovery of deposits of uranium ore to $6,400 for uranium oxide yielding up to twenty-five pounds with a pro rata payment for additional quantities. The Government's control of mica fields will be continued for another year, the Cabinet considering mica to be a strategic mineral of first-class importance, and the development of the mica industry essential. Approval was given for the sale or hire of machinery from Government stocks to mica miners.—*Australia.*

EAST AFRICA

Proposed Naval Force

At a conference at Nairobi between the Governors of Kenya and Tanganyika, the Acting Governor of Uganda, and the British Resident at Zanzibar, advantage was taken of the presence of the Commander in Chief, East Indies, the Commander in Chief, East Africa, and the Air Officer Commanding, East Africa, to discuss defense and internal security. Consideration was given to the establishment of a regular full-time East African Naval Force to supersede the present East African Royal Navy Volunteer Reserve. The new force will be controlled and administered by the East African governments, and come under the Commander in Chief, East Indies, for training. Legislation on the proposal will come before the East African Central Assembly.—*Journal of the Royal United Service Institution.*

GREAT BRITAIN

Underground Factory

A London subway, nearly completed when World War II started, saw service during the war as a large underground

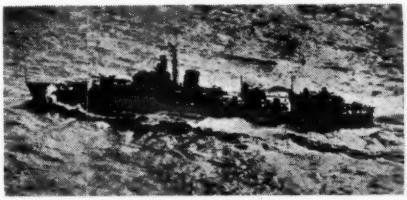
Drilling machine section in underground war factory.

factory, and has only recently been reconverted back to its original purpose.

The factory was completed in March 1942 and was in use until 1946, operating day and night, and at the peak period 4,000 persons were employed.—*The Illustrated London News.*

New Destroyers

This is one of four new destroyers recently added to the British fleet. The four "Battle" class vessels, *Jutland, Corunna, Agincourt* and *Matapan*, have a displacement of 2,315 tons, and are armed with five 4.5-inch guns and eight 40-mm antiaircraft guns along with ten 21-inch torpedo-tubes in groups of five.—*The Illustrated London News.*



USSR

Four-Jet Medium-Bomber

For the past three years there have been persistent rumors of the existence of four-jet bombers of Soviet design and manufacture. The jet bomber is a temptation and challenge to any designer, and to Sergei Ilyushin goes the credit of producing Russia's first successful four-jet medium-bomber.

Externally, this clean-looking, all-metal bomber shows the Ilyushin touch, especially in the tall fin and rudder. The jet unit mounting is interesting, the units being placed on brackets mounted close to the leading-edge and under the wings, This procedure places the jet unit nacelles well below and forward of the leading-

Ilyushin four-jet medium-bomber.

edge of the thin aerofoil section wing. Because of this thin wing and the particular mounting of the jet units, the main undercarriage units retract into the fuselage. Housing a crew of five or six, the fuselage has an unbroken rounded nose (seating pilot, co-pilot and bombardier) and sweeping gently back to the tail gun position which is reminiscent of the North American B-25 Mitchell and Boeing B-17 Flying Fortress. Besides the tail turret there is a rear fuselage dorsal turret, and armament for both possibly consists of twin 12.7-mm machine guns. The rear guns are mounted in the extreme tail. With the wing mounted so far back, it is obvious that the undercarriage is of the nosewheel tricycle type, possibly with small twin nosewheels.—*The Aeroplane Spotter.*

Soviet Arming

The Soviet Union spent more than $1,225,000,000 on atom-bomb development and other military research in 1947 according to the assistant director of the Central Intelligence Group in Washington. In addition, Russia spent at least $9,000,000,000 in 1947 for new equipment.

The USSR kept more than 500 German scientists at work on guided missiles and other weapons, including a tank which probably is the largest ever built.

The strength of the active force of the Russian Army was estimated at 3,800,000 men; that of the United States at 670,000 men. The Red Army has kept the 3,800,000 figure although thirty classes of conscripts were let go after World War II.

Demobilization has been on a systematic and selective basis, with infantrymen quickly released while technicians and armored force troops have been retained. This gives the Soviet Union an army with special skill in armored warfare.

The Red Army has maintained a professional cadre of two million officers and men. In addition, 800,000 to 1,000,000 men are being conscripted into the army each year for a two-year period. By this method the Soviet Union has been building up a trained reserve which in 1955 should total from 15 to 20 million men.—*Ordnance.*

New Bases

The Soviet Union is reinforcing its air and ground forces in Siberia. In the Cape Chukotski area (160 kilometers from the Seward peninsula in Alaska), the Russians are said to be constructing several military air bases. Russian jet planes are stationed there. In addition, the Petropavlosk air base in Kamchatka has become one of the principal Russian bomber bases. The Russians are also reported to have constructed a submarine base there.—*Forces Aeriennes Francaises.*

COLOMBIA

Bogota Agreement

Chapter XI of the Charter of the Organization of American States adopted at Bogota, Colombia, contains the following provisions:

Article 43

In case of an armed attack within the territory of an American State or within the region of security delimited by treaties in force, a meeting of consultation shall be held without delay. Such meeting shall be called immediately by the chairman of the Council of the Organization, who shall, at the same time, call a meeting of the Council itself.

Article 44

An Advisory Defense Committee shall be established to advise the organs of consultation on problems of military cooperation that arise in connection with the application of existing special treaties on the subject of collective security.

Article 45

The Advisory Defense Committee shall be composed of the highest military authorities of the American States participating in the meeting of consultation. Under exceptional circumstances the Government may appoint substitutes. Each state shall be entitled to one vote.

Article 46

The Advisory Defense Committee shall be convoked under the same conditions as the organ of consultation, when the latter has to deal with matters relating to defense against aggression.—*The New York Times.*

ARGENTINA

Jet Speed Record

For the first time in South America a jet-plane has flown at 900 km. an hour. The performance had no official character nor was any special preparation made previous to the flight. The plane was a Gloster Meteor of the Argentine Air Force.—*Aero Mundial Suplemento Argentino.*

MEXICO

Large Reserve

Mexico can call into armed service within 72 hours 1½ million young men already trained under the national compulsory military service law, the department of national defense announced recently.

During the five years that compulsory military training has been in effect, the department estimated 300,000 18-year-olds have received military training each year. They now constitute the army's reserve troops.

Not all of the 300,000 are inducted for full time service. More than half of that number get the equivalent of one day intensive training each week.

Compulsory training is arranged by lottery. Each 18-year-old has the opportunity to draw a white or black ball from a box. If he draws a white ball he must serve with the army. If he gets a black ball then he must report each week for one day of training.

The defense department said it issued orders last April to the thirty-three military zones to organize all trainees into reserve corps. Each trainee is registered and must keep in touch with the zone commander. All reserves are subject to call on any Sunday or holiday for a five-hour review.—News Report.

BRAZIL

Aeronautics

Electrical equipment valued at $300,000 has been purchased from the United States by the Brazilian Aeronautical Commission and will be used for two wind tunnels that are to be built at S. José dos Campos. Each of these tunnels will be powered by two 1,600 hp motors and will generate a wind speed of 240 mph; one of them is to be used "to perfect commercial apparatus" and the other will be used for training purposes.—*The Aeroplane.*

UNITED STATES

Math Experts Aid Research

An advisory committee composed of six leaders in the field of mathematics has been selected to confer with members of the Army's Research and Development Group.

The Deputy Director for Research and Development, Logistics Division of the Army General Staff, said the group will study such problems as: new applications of mathematics to military problems; implementation of the Army's research and development program to insure full use of future mathematical techniques; how to develop and apply mathematical methods to the solution of problems in strategy, tactics and logistics; and the future requirements of the Army in the field of high-speed computing machines.—*Armed Force.*

Two Seat Jet Trainer

America's first actual jet training plane, the Lockheed TF-80C, is now in production, to speed transition training in jet fighters for the Air Force. The new trainer is thirty-six inches longer than the standard P-80B, has a seven foot canopy and all equipment of its fighter counterpart.—Department of the Air Force.

Lockheed TF-80C, jet trainer.—Air Force photo.

Miniaturizing Signal Equipment

The pack-horse aspect of Signal Corps soldiering is passing into history. Today, vest-pocket type signal equipment, candy-bar sized batteries and all manner of portable radar, radio and radiosonde outfits lend a degree of streamlining to communications which was unknown at the end of World War II.

"Miniaturization" is the official description of this Signal Corps program which is designed to fit the task of communications into an Army geared for speed and mobility and in which much of the signal equipment used in the late war is becoming obsolete.

The miniaturization program of the Signal Corps embraces the whole field of communications, conditioned on comparable and, wherever possible, increased operational efficiency.

Some of the achievements are: A radar set which once required five, two and one-half ton, trucks to transport, reduced to the size of a standard office desk and easily transported in a single truck; midget storage batteries weighing only five and one-half ounces, capable of producing enough electrical energy, when used four to a pack, to operate a transmitter up to 100,000 feet above the earth's surface; a complete telephone switchboard weighing only two and one-half pounds which can replace the Army's standard sixty-pound instrument; radio tubes a fraction of an inch in length; and many other units of signal equipment.—Department of the Army.

Navy Pressure Tank

A hydrostatic pressure tank, large enough to hold a one-man Japanese submarine, has been installed at the Naval Ordnance Laboratory at White Oak, Maryland, where it will be used to test pressure on underwater missiles of various types. The tank is in four circular sections with 5-inch walls.—*The New York Times.*

Water Sterilization

There are under consideration two projects for field testing water sterilization tablets—Iodine (triglycene hydroperiodide). One involves the conversion of an entire water distribution system to iodine disinfection in place of chlorine; the other deals with the treatment of individual water supplies in canteens. These projects will be conducted in an area of high relative humidity and temperature to determine the physiologic effect of iodine. Pending the outcome of these tests and observations, consideration will be given to standardization of iodine tablets for individual water purification.—*The Bulletin of the U.S. Army Medical Department.*

Air Rescue Service

Four new flights were activated 1 June by the U.S. Air Force's Air Rescue Service, bringing to six the overseas units operated by this Service.

The Air Rescue flights are located at Ernest Harmon Air Force Base, Stephenville, Newfoundland; Goose Bay, Labrador Airport; Lagons Field, Terceira Island, Azores; and Kindley Air Force Base, St. George, Bermuda. During May, flights were opened at Dhahran Field, Saudi Arabia, and at Wheelus Air Force Base, Tripoli, Libya.

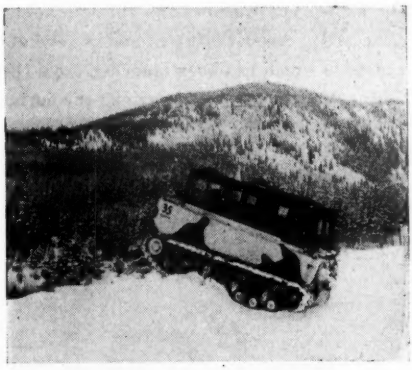
Search and rescue operations at the bases previously had been under control of the respective base commanders. Some personnel and equipment previously located at each place were transferred to Air Rescue Service for future operations.

Authorized strength of the units at Harmon and Goose Bay is approximately 100 men, while about thirty-six men are authorized for the flight at Lagons and Kindley. The unit headquarters at Harmon AFB has about forty men.

All six overseas flights are located on air bases operated by Military Air Transport Service, of which Air Rescue is a part.—Department of the Air Force.

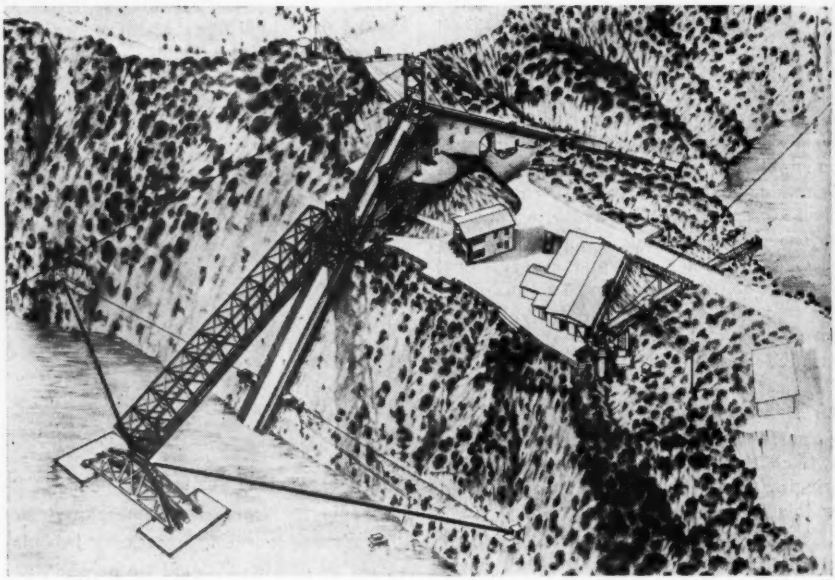
"Operation Timberline"

The 38th Regimental Combat Team of the 2d Division held extensive training maneuvers at Camp Hale, Colorado, during the early part of 1948. "Operation Timberline," the official name of the maneuver, was designed as a simulated attack by an aggressor force under conditions intensified by adverse weather and rugged terrain.—Department of the Army.



Above, a company commander using SCR-300 radio in "Operation Timberline." Below, Weasel operating over snow in Colorado mountains.—Signal Corps photos.

Torpedo Testing Apparatus

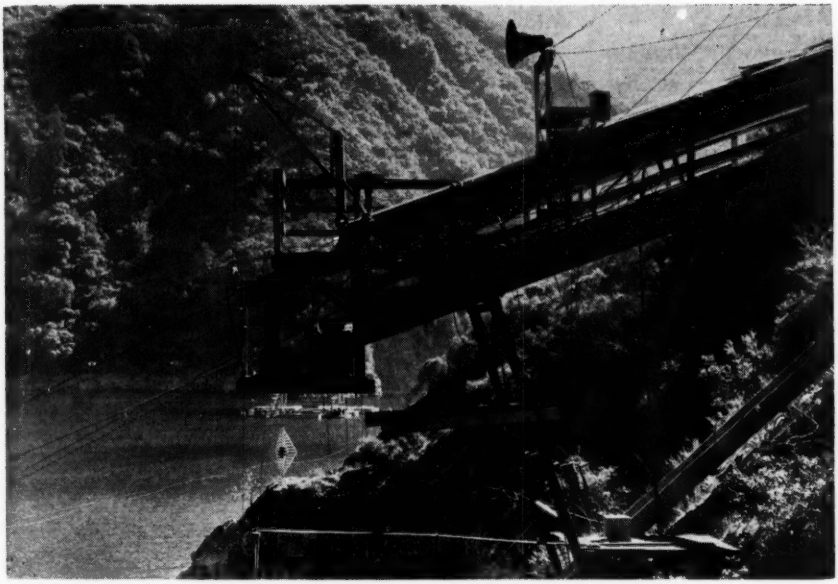


The sketch above shows the variable angle launcher with its trestle, the largest all-weld structure in America. It will mount several launching tubes of different diameters. Below, a torpedo which has been launched from the 300-foot fixed-angle launcher veers sharply to the left after striking the surface of the water.—US Navy photos.

At an eight-mile man-made lake formed behind Morris Dam in the Sierra Madre Mountains, twenty miles from Pasadena, California, Navy Research scientists are conducting numerous tests in an effort to improve the ballistic design of powerful underwater torpedoes.

The naval ordnance underwater division at Pasadena is a part of the big Naval Ordnance Test Station at Inyokern, California.

Nearing completion at Morris Dam is a launcher which will be able to fire torpedoes into the water at almost any angle that would be encountered in service. It consists of two large concrete ramps tow-



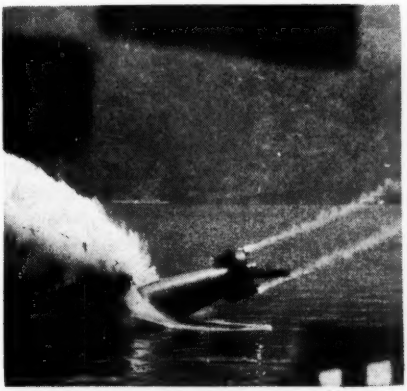
Shown above is the firing end of the 300-foot compressed air, fixed-angle torpedo launching tube which has contributed greatly to the improvement of aerial torpedoes. Below, a torpedo is entering the water; the horizontal object just to the rear of the missile is a float marker.—US Navy photos.

ering almost 250 feet up opposite sides of the lake's peninsula, forming a mammoth inverted "V." Rails on the sides of this ramp will permit raising and lowering of the upper end of a 300-foot bridge-like trestle and the lower end of this trestle will rest on barges in the lake.

The trestle will support several tubes similar to that of the fixed-angle launcher.

This new launcher is in addition to the 300-foot fixed-angle compressed air launching tube which hurls missiles into the water at terrific speeds.

Aside from the torpedo work, experiments and tests are being conducted with smaller caliber missiles.—*All Hands.*



MISCELLANEOUS NOTES

No Antarctic Uranium

Antarctica is not likely to be the scene of a "uranium rush" or any other kind of international scramble for mineral wealth, at least in the immediate future. The leader of the Navy's two-ship 1947-1948 Antarctic expedition reported recently that no minerals of any commercial value had been found at any point on the coast. The expedition worked its way along the shores of the world's southernmost continent through more than half its perimeter.

More than two tons of mineral specimens brought back by the geologist of the expedition were described as "just rocks." They do have considerable scientific interest, for by analyzing them it is hoped to get some idea of the geologic age of the continent. The expedition accomplished its primary mission, which was to make exact geodetic locations of certain landmarks, with which the air photographs taken on the preceding Navy expedition can be "tied in," thereby making more accurate charts possible.—*Science News Letter.*

Mines Still a Peril

Despite intensive minesweeping efforts of the Allied navies since the end of World War II, the world's seaways still are not free from the danger of mines, which have sunk or damaged more than 200 ships since VJ-day.

The United States Navy reports that few known areas in Europe and the Far East remain to be swept. It is estimated that these operations will take at least another year.

Mines on the sea bottom deteriorate with age. Moored mines eventually break adrift and float on the surface. The Navy emphasizes that every effort is being made to deal with all mines as quickly as possible.—*The New York Times.*

Jet Noise Harmless

Supersonic vibrations emitted by modern jet engines do not seriously affect human tissues. The noises, too high for the ear to interpret, were studied at the Navy's Aero Medical Equipment Laboratory in Philadelphia, with enlisted men and medical officers subjecting themselves to exposure.

Fatigue, loss of some weight, slight stomach disorders and toothaches were reported. But most of the men said they did not mind the noise of the jets as much as they did that of reciprocating engines.

Bureau of Medicine and Surgery experts who made the tests said they showed no evidence of the reported "supersonic sickness."—*The New York Times.*

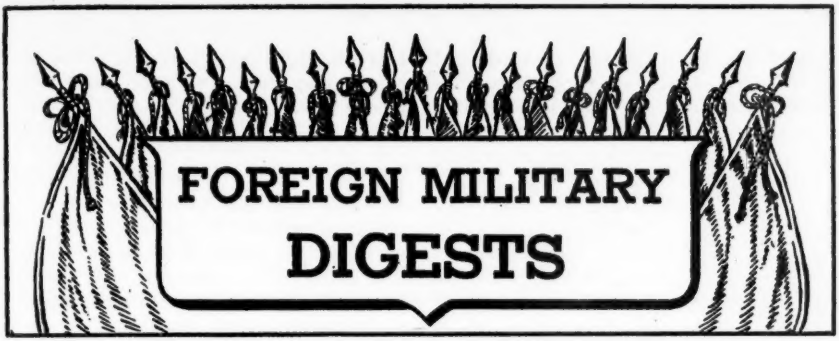
Jeep Tests

After twelve months exposure to subzero weather and 100 mph winds in the "icebox" of Little America, a Navy jeep and several other types of motorized equipment showed no signs of rust or appreciable damage. The equipment was started without difficulty.

The jeep, which had been left in a canvas-covered shed, started up without preheating, as did two diesel motor generators. Other equipment tested included two tractors and battery charging apparatus.

A wind-driven generator which had been running since it was erected by the 1933-1934 Byrd Expedition, illustrates the slow rate of deterioration of equipment in the enormous walk-in refrigerator of Little America.

Tents left standing by the 1947 Navy expedition were principal casualties of the wintry wasteland. High-velocity winds left only nine tents intact of the fifty-eight erected. However, it was failure of the attachments and not the canvas which caused their collapse.—*Armed Force.*



Morale

Digested by the MILITARY REVIEW from an article by General Sir William Slim in "The Army Quarterly" (Great Britain) April 1948.

MORALE isn't a matter of the Fighting Services only. True, an army without morale is nothing but a collection of unhappy, frightened men, but a nation without morale is just a collection of quarrelling, discontented sects and parties, with no unity and no real aim. Morale is the most important thing in any organization. It's the most important thing in this country now.

Feeling like that, when I got command of the Fourteenth Army I sat quietly down by myself to think out this business of morale. My thoughts ran something like this.

Three Factors

Morale is the intangible spirit of any body of men or women. Like courage, it's a state of mind, a mixture of emotion and reason. High morale means that every individual in a group will work—or fight—and, if needed, will give his last ounce of effort in its service. Now for a man, especially an intelligent man, to feel and act like that, his morale must have certain foundations—certain things on which it is solidly and firmly based. These foundations are, I think, first, spiritual, then mental, and lastly material. I put them in that order because that, I believe, is the order of their importance.

Spiritual first, because no other foundation of conduct will stand firm under real strain. I use the word "spiritual" not necessarily in the meaning of religious belief—though religion is and always has been one of the greatest foundations of morale—but in the sense of faith in a cause.

A man must believe that what his organization is working for is worthy of all the labor and sacrifice he may be called upon to give—that it has a great and vitally necessary object, a noble object if you like. Next, he must feel intensely that he is part, even if only a small part of that organization, and that what he is and what he does really counts in it.

So much for the broad spiritual foundation of morale. What of the mental ones? First, I think, the intelligent man must be convinced that the object of the organization is really attainable. Second, he must feel that he belongs to an efficient show, one in which his efforts—perhaps his life—are not likely to be wasted. As the third mental foundation, he should, whenever possible, know *why* he is asked to do certain things.

That brings me to the material foundations. I have put these last, because you can have good morale—in fact, the highest

type of morale—amid the worst material conditions. But any leader would be very unwise to expect it, and he certainly wouldn't get it unless his men knew that he was doing everything he possibly could to improve those conditions. That, in fact, is the material foundation of morale—not that conditions are perfect or even good, but that the need for improvement is recognized and that improvements are being made at the best rate they can be.

It was on these foundations, spiritual, mental and material, that we began to build up morale.

Now I know, very well, that lots of things can be done in the Army that can't be done in civil life. But after all my gunner in his green battle-dress is now in dungarees in some factory, field, mine, shop or office somewhere in Britain. He's still the same chap, and he would still respond to the same appeals if they could be seen to apply equally to the job he's doing now.

Is there any reason why they shouldn't? Take the spiritual foundations that we worked on. We've got these in Britain now as we've never had them before. We none of us doubted, nor do we doubt now, that this old country of ours and all she means in tolerance and freedom for us and for the world was worth fighting for. And if all that was worth fighting for then, it's worth working for now. The object—the survival of our way of life—is the same; any man or woman in this country who does an honest day's work should feel a part, and a very real part, of the greatest team of all—the British people.

But it's not enough to have a worthy object; you've got to convince everyone in the party that it *is* a worthy object. What might have seemed obvious to me, sitting in Army Headquarters surrounded by maps, reports and returns, might not be so self-evident to the orderly at my door who hadn't seen his wife for four years, or to the wet, hungry soldier up there in the jungle who was being shot at. It may not be so plain to a lot of people now.

Personal Contact

We found that the best way to convince men that what they were doing was worth while was to tell them yourself. The spoken word, delivered in person is the greatest instrument. An occasional talk by the man who holds the responsibility for the show counts a lot. It doesn't need an orator. Any man who holds control over others should be able to do it, provided he has two qualifications. First, that he's clear in his own mind about what he wants to put over, and secondly that he believes it himself. That last is important.

Such talks shouldn't be high-souled expositions of lofty aims. You've got to come down out of the clouds and talk about the things that occupy men's minds—pay, housing, working conditions, prospects—but at the end, whatever the audience, give a final word on a higher plane, on the spiritual foundations.

People will always respond—sometimes a shade disconcertingly. Once when I had talked to a battalion about a coming offensive, a little Cockney sergeant jumped up and said: "When the day comes, we'll all be behind you!" I felt compelled in honesty to reply: "Don't you believe it, sergeant. When the day comes, you'll be quite a long way in front of me!"

It's easy to get unity and enthusiasm at the top. We used to do that by conferences of senior staff officers, when all present could feel themselves—and what was more important *see* themselves—as a team. The real task is to get that feeling down to those with the duller, less well-paid jobs. We did that in the Army largely by unit information rooms, where any soldier could find out what was going on, not only on his own little front but on others, and by talks from commanding officers. We took some risks with security,

but those were more than compensated by the gain in morale from every man feeling he was in the know.

Then, too, in any big organization there are bound to be large sections not in the limelight. Until something goes wrong no one remembers them. It's a very good thing for the man in charge sometimes to visit these sections and let them know from the boss himself that they too are parts, and essential parts, of the machine.

Attainable Objective

Now for the mental foundation of morale—that the object must be attainable, that the organization is efficient and that a man knows why he's asked to do things.

Our over-all object is the restoration of the prosperity of this country. If you examine the shortages and difficulties which so hamper us in achieving it you'll be surprised to find how many of them are really only marginal—another 5 per cent here, another 10 per cent in output there. Such efforts are within our capacity. We have the industrial skill, the scientific knowledge, the resources and the character. Of course we can do it. Our object *is* achievable.

The way to convince a man he belongs to an efficient show is first of all to *have* an efficient show—an organization where the job gets done without fuss, people aren't kept hanging about and there's a steady rhythm of work. Remember, too, that often, especially for a headquarters, it's not enough to *be* efficient. You've got to *look* efficient.

In any sort of society and in any organization somebody's got to give the orders. It is no use being startled at that, and it's no use treating an order merely as a basis for discussion. Orders have to be carried out. But wherever it's possible, it's a very good thing to explain why an order is given, why things are done in a certain way, what the article being made is used for.

Material Factors

That brings me to the material foundations of morale—where the man lives, the conditions under which he works, the tools he uses and what he gets for his labor. We are rightly increasingly concerned with these things, yet more dissatisfaction arises basically through neglect of the spiritual and intellectual foundations than in failure of the material. Often the material hardship is the irritant that inflames a deeper discontent. The specified grievance, although it may be justified, is not the real cause of the trouble. It is not that conditions are bad that upsets men so much as delay or failure to *recognize* that they are, and to take steps to improve them. For example, few things are more discouraging than to ask men to work with obsolete or worn-out equipment —yet if it can be shown that there is a good reason why it can't be replaced at the moment and that at the same time everyone above them is going all out to get the better tools, men will come to take a fierce pride in overcoming their difficulties.

Well, those were the foundations on which we built morale. I think they apply equally in peace or war, to soldiers or to housewives. I believe that any organization, by basing its efforts on those same foundations—spiritual, intellectual and material—can get the same results and make itself a united, efficient and effective team. And morale means more in an organization than success. It means that those who belong to it will be happy in their work—and that's a big step towards being happy in life.

Sweden as a Base for Great Power Aviation

Translated and digested by the MILITARY REVIEW from an article by Ebbe Lindblom in "Ny Militär Tidskrift" (Sweden) No. 3, 1948.

IN the public discussion of present defense problems, it is usual to assume that Sweden, after a certain length of time, in case of war, will not be obliged to stand alone, but will receive help in the form of fighting forces from some large power, a large power bloc or the United Nations' armed forces. The help able to come quickest would be that of a supporting air force. Excessive optimism is customary with respect to the speed with which help will be able to arrive as well as its extent. To correctly grasp all pertinent factors is particularly difficult, and the present article aims only to throw some light on the matter. An estimate cannot extend too far into the future, and consideration has only been given here to where developments may lead within the next five to ten years.

What can the great powers gain by basing aviation in Sweden? With the ranges which modern planes possess, bomber formations are able to reach any place within the enemy's territory from presently existing base areas. At the same time, we must still count on every bombing operation requiring fighter protection. It is not, therefore, the bomber ranges, but the fighter ranges that determine how far a bomber operation can extend. As is well known, the fighter's radius of action is considerably shorter than that of the bomber. The change-over to jet propelled planes has been accompanied by a still further diminution of flying range as compared with the propeller driven fighter.

Sketch 1 shows schematically the significance of the 250-mile fighter (a normal operating radius during World War II) based in Scandinavia. The shaded portions show what parts the great powers' bomber operations cannot reach unless escort fighters are based here. As is evident from the sketch, the eastern bloc would suffer the most disadvantages from an adversary's seizing possession of our country. It would have to be taken into consideration that the eastern powers would attempt to prevent the adversary from taking possession of the Scandinavian peninsula. By advancing fighter aviation to our territory, the eastern powers would insure earlier entry into action of fighter defense against enemy attacks and, at the same time, increase the depth of their defense.

Types of Bases

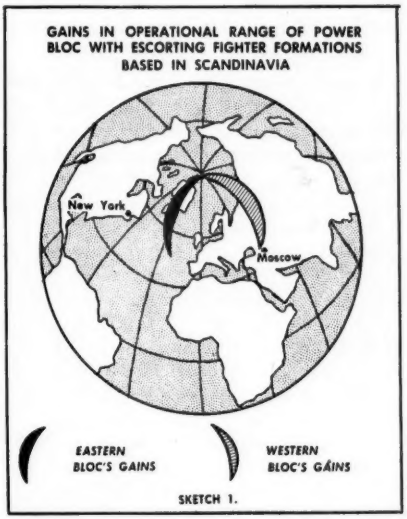
What type of aviation might be expected to be based in Sweden? Air bases in our country may serve either offensive or defensive ends. As has been stated above, from the point of view of flying radius, bombing aviation does not need to be based in Sweden. A great power would, however, reap certain advantages from basing bomber formations here. It would, for example, mean a shorter time for arriving at the target, less fuel consumption, larger bomb loads, etc. But these bomber bases would require extensive, vulnerable maintenance which would require ocean transportation, and for this reason such basing would not be of any great advantage. In addition to this, it must be remembered that Sweden possesses no airfields suitable for basing heavy military aircraft. The creation of new ones would require a great amount of material, machinery and labor. It would, in addition, require considerable time. All this makes it less probable that a large power will base any bomber formations within our boundaries. In any case, it could not happen until after war had been going on for a very long time.

What a supporting nation strives for, above all, is bases for escorting fighters. The principal employment of escort for-

mations is evident from Sketch 2. The long-range bombers, during the first part of their flight and that part of it which lies over Swedish territory, will likely be escorted by fighter aircraft with shorter flying ranges. Only at the extreme limit of the short-range fighters' flying radius will the fighter formations with greater flying range take over and remain in charge of the escorting mission from there on to the target, then back again to the short-range fighters' radius of action. Those fighter aircraft which act as escort for the bomber formations from their bases to our territory may be imagined as landing at Swedish air fields in order to resume, later, the escort on the last part of the return journey. They would operate, therefore, in a shuttle system.

Our air arm's numerically weak fighter formations will not be able to be counted on to provide fighter protection for the helper's air bases. Our air arm is not fitted for protective missions of this magnitude. In order to secure his bases in Sweden, the helper must lend his support with local fighter units. In the present situation, it is of importance that night-fighter formations be provided, otherwise effective protection at night cannot be counted on.

It must be clear to all that we shall obtain no help for our own sake, but


GAINS IN OPERATIONAL RANGE OF POWER BLOC WITH ESCORTING FIGHTER FORMATIONS BASED IN SCANDINAVIA
New York
Moscow
EASTERN BLOC'S GAINS
WESTERN BLOC'S GAINS
SKETCH 1.

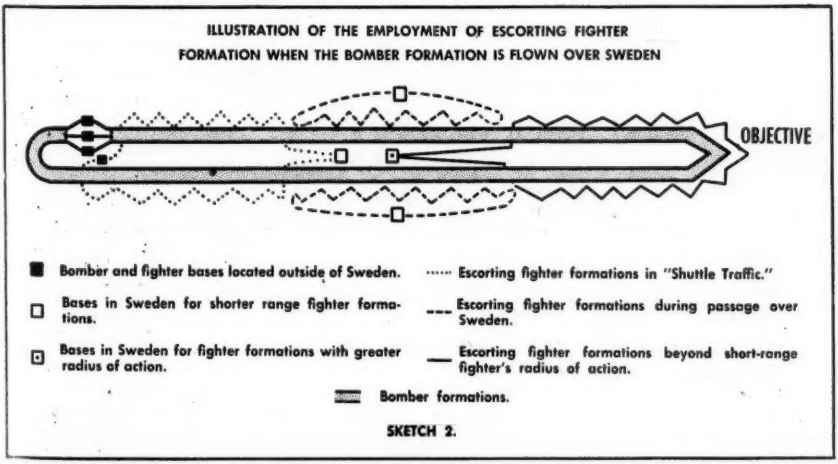


ILLUSTRATION OF THE EMPLOYMENT OF ESCORTING FIGHTER FORMATION WHEN THE BOMBER FORMATION IS FLOWN OVER SWEDEN
OBJECTIVE
Bomber and fighter bases located outside of Sweden.
Bases in Sweden for shorter range fighter formations.
Bases in Sweden for fighter formations with greater radius of action.
Escorting fighter formations in "Shuttle Traffic."
Escorting fighter formations during passage over Sweden.
Escorting fighter formations beyond short-range fighter's radius of action.
Bomber formations.
SKETCH 2.

because this help is of advantage to the supporting power itself. Attack formations can, therefore, be conceived as being based in Sweden only on condition that they will constitute a supporting force for the helper's own ground or sea forces. This can be expected only during a later phase of the war.

Availability of Air Fields

A small country such as Sweden with a relatively small air force does not possess the multitude of air bases that a large supporting power would require. Our air fields are, in point of number and quality, suitable for our own air force. There exist no possibilities of immediately receiving a large number of foreign planes. Before any more extensive help can be had from other air forces, extensive enlargement of the existing air fields and creation of new ones must take place. The air fields that would be required are: landing fields for fighter aircraft engaged in shuttle traffic; fields for the basing of short-escort fighters; fields for the basing of long-escort fighters; and fields for the basing of local fighters (also night fighters). Together with these, a smaller number of fields for use by heavy bombers for intermediate and emergency landings would also be needed.

As can be seen, a fairly extensive network of bases is required. Their construction would take considerable time. If our country counts on obtaining help from abroad without too great a loss of time, this air field construction must be planned and begun in time of peace.

Defense Gaps

One of the conditions for our receiving help from abroad is that the enemy has not captured or destroyed our air fields nor cut the communication lines for their maintenance with his air force. All the military efforts from our side must be directed toward maintaining favorable bases for the arrival and departure of the helper's formations.

An enemy can render our air fields harmless in two ways. He can capture and occupy them with the help of ground forces, or he can damage the runways and other installations, and the communication lines necessary for their maintenance, with bombers and rockets. The direct repulse of such a threat must be effected by both ground and air forces. There is required not only operational army units, but also local and home defense, and fighter, attack and reconnaissance aviation. Building up a defense force without all these component parts and, at the same time, believing that we shall receive help from the outside, is leaving all too much to chance.

Isolationism can no longer exist. The economic, political, and ideological affinities will determine international relations and will inevitably create other determinants, strategic in character, that in periods of tension will undoubtedly replace the former. The principal duty of political directors will be to recognize strategic values that will give groups or political blocs their greatest advantages.

General Lopez Valencia, Spain

The Atlantic Pockets

Translated and digested by the MILITARY REVIEW from an article by Max Jordan in "L'Armée Française" (France) No. 24, March 1948.

ON 30 July 1944, the American breakthrough at Avranches on the Normandy front opened a decisive phase in the development of operations. It represented the first strategic exploitation of the success after the difficult battles of June and July, in which two offensives, one through Bayeux, the other in the direction of Caen and Paris, had created in advance the consolidated zone which was necessary for operations of any magnitude.

The basic factor which determined the zone where the initial assault would take place was derived from the fact that the consolidation zone must possess ports capable of maintaining a force of twenty-six to thirty divisions, and of permitting the augmentation of this force at the rate of from three to five divisions per month.

On this basis, it was decided that the initial landing on the continent would be effected in the Caen sector and that the zone of consolidation, to be seized later, would be that comprising Cherbourg and the Brittany ports.

To this end, a drive toward the south would be effected with the view to seizing Nantes and Saint Nazaire, followed by Brest and the less important ports of Brittany. The bridgehead would be consolidated on the left flank, along the Eure, from Dreux to Rouen, and from there along the Seine as far as the sea, while Chartres, Tours and Orleans would be occupied.

As soon as the Allies developed communication lines and established an adequate air force in this zone, they planned to commence operations toward Paris and the ports of the Seine, with subsidiary operations destined to free the ports of the Gulf of Gascony for receiving American reinforcements of men and matériel.

With ninety divisions the inter-Allied headquarters also estimated reinforcements from the FFI (Forces Françaises de L'Intérieur) at fifteen divisions.

Operations in Brittany

Brittany was included in the initial Allied consolidation zone. The FFI had at their disposal very effective units, and liaison had been insured with the Allies, through the parachuting of radio missions and elements of the SAS (Special Air Service).

The objectives of the FFI in region M (Brittany), consisted of the following: sabotage of rear areas before the operation and preventing the arrival of reinforcements; and liberation of the territory situated off the principal axes of the American breakthrough; and the liquidation, with Allied assistance, of pockets of resistance.

The plan, a remarkable example of a combined operation by armored and guerrilla forces, saw its first phases crowned with success.

By the end of August, the mopping-up operations had been completed, and the Germans were grouped in three pockets whose reduction was now to require the efforts of artillery and particularly the efforts of aviation.

Brest-Audierne Pocket

This pocket contained from 40,000 to 50,000 men under the command of General Ranke. A mine barrier closed the Brest corridor between Mingan and Kerloc. The coasts were defended by powerful batteries, the ammunition supplies of which were considerably reduced. The defending troops had received the order to hold at any cost. In the face of this critical situation, and in the absence of a defense turned toward the interior, the Germans

planned to attempt a movement toward the Lorient pocket. The FFI began energetic action to prevent the junction of the enemy forces. The Allies, who attached particular interest to the liberation of Brest, on 28 August bombed all the military objectives of Lannoc, Plougastel, Ile-Longue and Roncavel, whose antiaircraft defense positions were practically annihilated. The FFI went over to the offensive, and on the 26th they reduced the Pointe de Corsen, and on the 28th the Kerve center of resistance.

The Germans decided to attempt to reach the fortified city of Lorient by sea, a movement which began during the night of the 29th. Thanks to land action, this operation met with little success.

Lorient Pocket

After the arrival of reinforcements from Brest, the strength of the enemy forces was raised to 35,000 men, with from four to five thousand SS troops assigned to each unit. The enemy's artillery comprised 500 pieces, with ten units of fire, including one battery of 340-mm guns.

Commanded by General Fachlembach, this pocket was one of the best defended and it no longer entered into the American plans.

At that time the Saint Nazaire pocket, an area of 200 square kilometers, was strongly defended and occupied by 30,000 Germans. It formed a part of the sector of the American 84th Division and was also invested by the FFI.

Situation South of the Loire

At the same time that Patton's Third American Army occupied the right bank of the Loire, and was headed for Chartres to attack Paris from the rear, information was received of an order for a general withdrawal of the Germans toward the east.

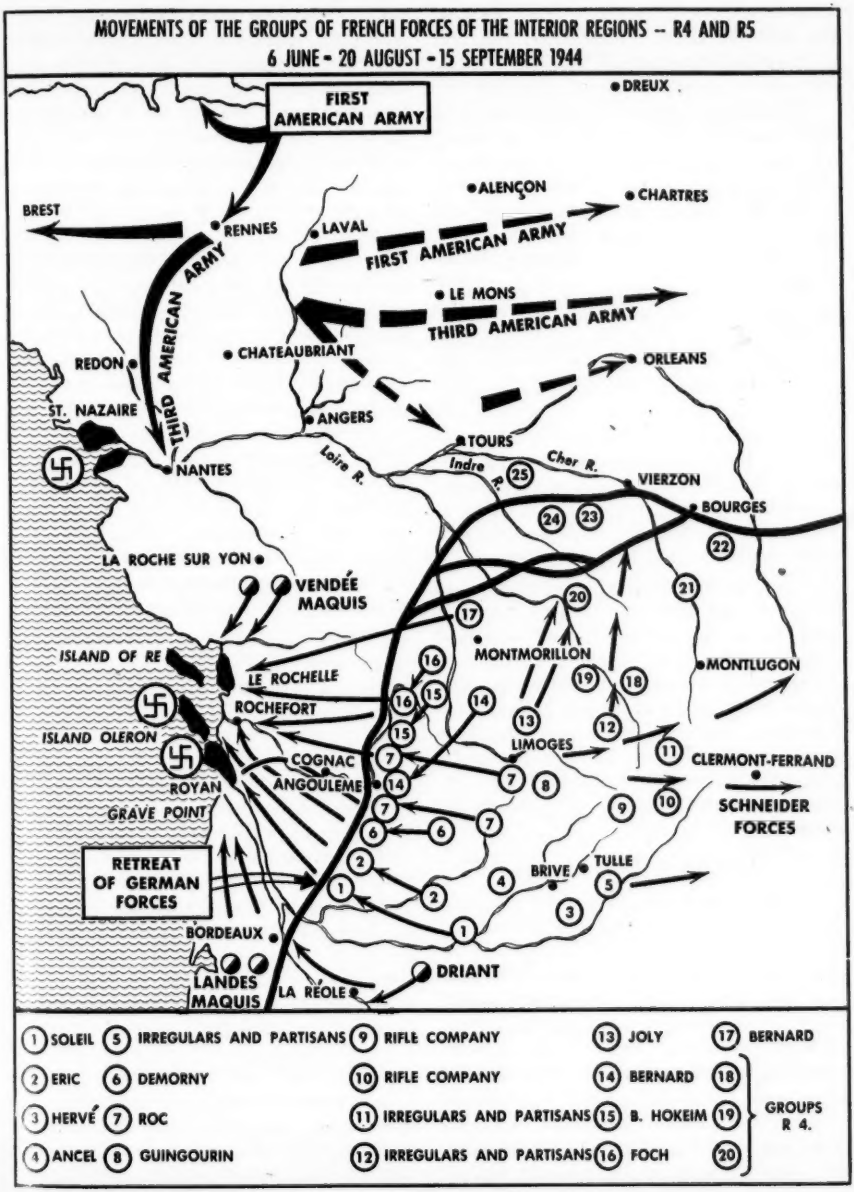
Between Nantes and Bayonne, the coast was occupied by 260,000 men in units of diverse composition and combat value—armored columns, SS formations, naval forces, administrative units, etc. Their armament was relatively powerful.

The German command estimated that the Central Plateau zone, with its difficult routes and numerous obstacles, was occupied by more than 50,000 FFI and was too formidable to cross. The failure of an attempt to relieve the Tulle garrison on 16 August was striking proof of this. The Germans tended to withdraw their garrisons from the Central Plateau toward Clermont. Often, German forces were abandoned to their fate. The Bayonne and the Bordeaux units, successively, grouped their forces and headed northeastward, following the line of march, Angoulême - Poitiers - Vierzon - Bourges - Troyes - Germany, passing into the 100-kilometer breach between the Loire and the northern foothills of the Central Plateau.

The FFI of regions R 4, R 5, B 1, and B 2 at that time numbered 100,000, but were dependent on their own forces and inadequately supplied with heavy weapons. They had a dozen 75-mm and 25-mm guns, and a fairly large number of rifles and antitank bazookas, but little ammunition. Most of the light organic weapons were automatic rifles.

The units were generally organized into light battalions of from 300 to 500 men, combined in groups of two or three (rarely more) battalions. However, due to well-supplied transportation groups and the capture of large stores of gasoline, their tactical mobility was considerable. The battalions of Dordogne and the Charentes made the journey to the sea in a few days, three battalions of reinforcements reached Lyons by highway, and two battalions from Tulle took up positions south of Issoudun at the beginning of September.

Rendered wiser by experience, the German units retreated by marching on a broad front, protected by flank-guards. They thrust out "punitive" points, and


MOVEMENTS OF THE GROUPS OF FRENCH FORCES OF THE INTERIOR REGIONS -- R4 AND R5
6 JUNE - 20 AUGUST - 15 SEPTEMBER 1944
FIRST AMERICAN ARMY
DREUX
ALENÇON
CHARTRES
BREST
RENNES
LAVAL
FIRST AMERICAN ARMY
THIRD AMERICAN ARMY
LE MONS
THIRD AMERICAN ARMY
REDON
CHATEAUBRIANT
ORLEANS
ST. NAZAIRE
ANGERS
TOURS
NANTES
Loire R.
Indre R.
Cher R.
VIERZON
BOURGES
LA ROCHE SUR YON
VENDÉE MAQUIS
ISLAND OF RE
LE ROCHELLE
ROCHEFORT
ISLAND OLERON
COGNAC
ROYAN
ANGOULEME
GRAVE POINT
MONTMORILLON
MONTLUGON
LIMOGES
CLERMONT-FERRAND
SCHNEIDER FORCES
RETREAT OF GERMAN FORCES
BRIVE
TULLE
BORDEAUX
LANDES MAQUIS
LA RÉOLE
DRIANT
1 SOLEIL
2 ERIC
3 HERVÉ
4 ANCEL
5 IRREGULARS AND PARTISANS
6 DEMORNY
7 ROC
8 GUINGOURIN
9 RIFLE COMPANY
10 RIFLE COMPANY
11 IRREGULARS AND PARTISANS
12 IRREGULARS AND PARTISANS
13 JOLY
14 BERNARD
15 B. HOKEIM
16 FOCH
17 BERNARD
18
19
20
GROUPS R 4.

with turning movements, worked back of the FFI positions. The terrain was flat and sparsely wooded and did not lend itself easily to ambushes.

Without the support of armor or aviation, the FFI could not count on blocking the retreat of the enemy. The example at Issoudan came too late to show in a striking manner that interdiction was possible if France-Allied cooperation was as close as it had been in Brittany.

After leaving Châteauroux, from which the FFI had evacuated all the vehicles and fuel during their ten-day occupation, General Hassler's rear-guard forces, more than 20,000 strong, headed for Issoudun. Attacked from both sides of their route of march, and harassed by Allied aviation, the Germans surrendered on 12 September to an American officer who came especially for that purpose from Orleans. During their march, the Germans had lost 1,800 men and the FFI nearly 500.

A guerrilla and armor or aviation operation of the kind employed at Issoudun would have led to considerable strategic success, ending with the capture of ten German divisions or their equivalent. But about that time a startling piece of information had arrived which explained somewhat why the tanks from the north had not arrived: the government had ordered the dissolution of all FFI commands and units.

Drive Toward the Atlantic

It seems that the Germans at first attached only a secondary role to the control of the Atlantic ports, compared to the emphasis placed on them in the plan of "Overlord." The withdrawal from Brest toward Lorient was intended only to regroup in positions which would be more easily defended, prior to a movement southward for evacuation by sea and, in small groups, toward Spain.

By the end of August, the forces which were cut off without any hope of retreat were extremely demoralized, and it was not until after the delays of the Allies that the German high command got the situation in hand and dispatched experienced cadres to the ports, in an attempt to profit from the pockets.

On the French side, the FFI were in contact with the enemy by the latter part of August. The drive toward the Atlantic was the general phenomenon of the rush to battle of the units rendered available by the liberation. Twelve groups of battalions, representing approximately 15,000 men, converged on La Rochelle, Rochefort and Royan. The *maquis* of the Landes, and four groups from Dordogne and Corrèze, invested Bordeaux, which was evacuated without combat, and Grave Point. The *maquis* of Vendée occupied the cove of Aiguillon north of La Rochelle.

What was lacking in this large force was unity of command. Region B (Bordeaux) had been deprived of regional command since the disappearance of Colonel Vergaville, who was betrayed by traitors.

On 29 August, General Bertin-Chevance was appointed by the Algerian government to command the zone situated south of the Loire and west of the Rhône. Prior to this, General Cochet had been assigned a mission which to a large extent covered that of the former. Great confusion developed in the commands. The end of this situation was not reached till the appointment of General de Larminat on 23 October.

Arriving at Toulouse at the beginning of September, General Bertin put aside, momentarily, the crucial problem of the Atlantic, and decided that the élite of the *maquis* of R 3 (Montpellier), R 4 (Toulouse), R 5 (Limoges), and R 6 (Clermont-Ferrand), would be grouped in a column which would advance along the axis: Moulins—Autun—Alsace. This was tantamount to saying that the guerrilla units, even those selected from among the best equipped, were going to fight in the

open. Although certain elements of the column, later called the Schneider column, covered themselves with glory on the Alsace front, the operation was later to suffer defeat. Held aloof by the First Army, which was more desirous of reinforcing its tested units than of adding any new units, the different groups of the Schneider column were broken up and only a small fraction were transformed into regular units.

Meanwhile, the possibilities of a rapid decision in the west were vanishing. The German commands which were considered too luke-warm were replaced by others that were solidly Nazi.

The task still remained of transforming into the French Second Regular Army, before the final attack, those forces which had already assumed the name of FFO (Forces Françaises de L'Ouest). But they were to receive their training and organization to fight, at the same time as new, regular units were organized from the 100,000 men then under the colors in their local areas.

But this resurgence was to stagnate in what was well designated as the "front of the forgotten men."

FFO and the Atlantic Army

In view of the deficiencies in the southwest zone command, the National Headquarters of the FFI proposed to entrust the direction of the Atlantic operations to General Petibon, a man of clear vision and good judgment. After some delay, General De Gaulle, during an inspection, suddenly designated Colonel Adeline as coordinator of operations. Colonel Adeline was commander of a *maquis* of south Dordogne. He was now to exercise command over former chiefs, or neighbors in combat, a situation which is always delicate. Though in a difficult situation and aided little by the ones who placed him in command, he had effected an exact designation of sector, units and tactical mission by the end of October when General Larminat took command. The units, now organized as regiments, conducted their own training by turning to profit the battalion relief periods.

At the beginning of 1945, several regiments which had been recruited in their home districts, joined these forces. They now lacked only the necessary means, heavy weapons, armor and aviation, for passing over to the offensive. The adversary had accumulated considerable defenses, notably mine fields, against which any premature infantry action would result only in failure. But before any such thing came to pass, the tragedy of Royan occurred.

The Tragedy of Royan

Royan was defended by 10,000 men, 200 guns and two successive mine fields with a total of 450,000 mines. The FFI units which were blockading Royan, Oléron and Grave Point consisted of 34,000 men without heavy weapons, except a few salvaged guns, and no radio communication.

By the end of December, the organization of the French units had progressed greatly. A large movement on the part of reinforcing units (one Zouave regiment, two battalions of Spahis, three squadrons of tanks of the 2d Armored Division, and two squadrons of tanks from the 13th Dragoons) forecast imminent action. The "Patrie" aviation group was placed at the disposal of General Adeline, who was in command of the Southwest Group at Saintes. A rocket group was created as an entirely new unit, using German matériel. The Resistance was in regular contact with the command post at Saintes. The plan of defense was known in detail. Although the high command of the FFO judged the "services rendered inestimable," there was never for a moment any thought of supporting an offensive by means of interior action through the parachuting of weapons. Dozens of patriots were captured and tortured.

On 6 January, Royan was completely razed by Allied aviation. Three hundred bombers in two waves, poured 600 tons of bombs onto the city. The operation took a toll of 1,000 lives. But the German defenses remained intact.

At the same time, the Alsace offensive began. The majority of the units of the First Army which were headed westward en route to Royan, suddenly reversed their course.

Various versions of this tragic error have been given and of the failure of the January offensive. According to one, English squadrons, en route to Germany, were re-routed while in flight and, therefore, did not possess the city's defense plans which, however, had been handed over repeatedly to the inter-Allied headquarters by the headquarters of the antiaircraft defense. According to another, the Royan affair was only a diversion destined to deceive the enemy with regard to our offensive intentions in the east.

The attack on Royan was not resumed till 14 April. It was thus so near the German collapse that it presented only the aspect of a brilliant, school exercise with combined ground, naval and air forces.

Royan-Oléron Operation

The ground forces were divided into three groupments in the Royan-Oléron operation.

1. An Oléron brigade, commanded by General Marchand, had the objective of La Tremblade and a landing in the southern portion of the island of Oléron. It comprised two FFI regiments (158th and 50th Infantry Regiments), two groups of 75-mm, one group of 155-mm guns, and one company of the 92d Engineers;

2. A northern groupment, commanded by General d'Anselme, had the objectives of Royan and La Coubre. It comprised: one regiment (4th Zouaves) and four makeshift battalions, the 12th Regiment of horse cavalry, and three group of artillery.

3. A southern groupment, commanded by General Adeline, had the objective of Saint Georges, and then Royan. It comprised seven FFI battalions, two armored squadrons, five groups of 75 or 105-mm howitzers and one engineer company.

The reserves at the disposal of the groupments were considerable for such an operation: four infantry regiments, three tank squadrons, and ten groups or batteries of medium or large caliber guns.

The naval forces comprised the *Lorraine* and the *Duquesne* and five war vessels of different classes.

Aviation had at its disposal one reconnaissance group, a fighter group, and three bomber groups as organic means, and three wings of reinforcements (French Third Wing with P 47s, the Forty-second Bomber Wing with B 26s, and one from the Eighth Air Force with B 17s).

The operation began on the 13th by outflanking the outposts, and the attackers were in position to reduce the city by the 16th. At the same time, the Oléron brigade took La Tremblade and made contact with the Gironde division. On the 17th the fortified works on the coast were mopped up one by one. On the 18th, Rear-Admiral Michaelis accepted the surrender of the enemy.

La Rochelle Pocket

The FFI units marked time before La Rochelle until the enemy, under threat of reprisals for any destruction, surrendered the port and military installations intact.

Rapidly organized into regular units, the investing forces comprised, at the beginning of 1945, three regiments: the 108th Infantry Regiment (Demorny), the 114th Infantry Regiment (Chaumette), the 78th Infantry Regiment (Brodhurst) with a total of 10,000 men.

Opposing them, the Germans had 15,000 men, 300 guns, a two-year supply of rations, and a determined commander, Admiral Schirlitz.

Adhering strictly to the tactics defined

by the national headquarters of the FFI, the troops had to contain numerous raids on the part of a vigorously striking enemy. The action at Saint Jean de Diversay on 10 March cost the FFI 150 killed and 500 wounded.

The attack occurred between 30 April and 5 May, with the addition of the 26th Infantry Regiment (Colonel Mingasson), one armored squadron, and four artillery groups.

The enemy's lines were broken on 3 May in the direction of Saint Médard, while, at the same time, local engagements were general over the entire front. The surrender of La Rochelle occurred on 7 May.

The operations of the Atlantic front will doubtless be assigned their place in history as stubbornly contested operations of but little attending glory. The existence of the pockets, however, exerted a weighty influence on the French military recovery before the end of hostilities, and even on French economic recovery. Formation of the pockets could have been largely avoided with a little more initiative and confidence in the possibilities of guerrilla forces properly organized and modernly equipped.

What would have happened if these combatants who were under no "official" orders or obligation to fight, had complied, literally, with the order to disband and return to their homes? Forces amounting to six or seven divisions in strength would not have been on the Allied front. It is well known how dangerous the last German efforts were at Bastogne and in Alsace, and how narrow was the margin of victory.

But the superb *maquis* fought for eight months, indifferent to what went on behind their backs. That is the thing that military history will note when sufficient time has elapsed for events to take their proper order.

Russian Tactics

Translated and digested by the MILITARY REVIEW from an article in "Allgemeine Schweizerische Militär Zeitschrift" (Switzerland) April 1948.

THE following facts are to be noted in an interesting study on Russian tactics published in the March number of the Danish "Militaert Tidskrift":

Organization (at end of war):—*Infantry regiment*, three battalions, eight 45-mm antitank guns, 75-mm regimental guns, six 120-mm regimental mortars, one machine-pistol company; *infantry battalion* of three rifle companies, one machine-gun company with nine machine guns, one mortar company with nine 82-mm mortars; *rifle company* of three rifle platoons, one 50-mm mortar platoon, six antitank rifles; *rifle platoon* of four groups of nine men with one machine gun and one automatic rifle with telescopic sight.

Attack:—The line of departure, is, as a rule, chosen some 800 meters from the enemy's main line of resistance. After moving forward to the attack position, the forces dig in for protection during the artillery preparation. In the case of a combined attack with tanks, the rifle companies follow immediately behind the tanks. The friendly tanks are not to separate themselves from the infantry, and are to engage in action with enemy tanks only when they are clearly superior in strength. The enemy's tanks are mainly opposed by artillery.

The infantry is trained to approach to within 150 to 100 meters of the enemy position under their own artillery fire. They are to take the losses due to short shots as a matter of course, since they are less than those occasioned by the enemy's automatic weapon fire after the lifting

of the artillery fire. The artillery fire is laid down at the given moment by direct firing guns, mortars and tanks. During the actual attack, the ground forces fire as they move, covering the enemy position with unaimed but dense fire. As a rule, excessively deep grouping during attack is regarded as incorrect, because by such grouping, full exploitation of fire power is rendered difficult.

Defense:—The Russian principles in defense seem unusually clear and definite, almost schematic. Above all, defense organization aims at repulsing armored attacks. Normally, the defense zone is expected to possess a depth of from five to six kilometers. The combat outposts are placed from one to three kilometers ahead of the defense zone. As a rule, strongpoints and antitank obstacles are constructed ahead of the defense zone; both of these are located to facilitate flanking fire.

The defense area of a battalion is expected to be some two kilometers in breadth by one and five-tenths kilometers in depth. This is subdivided into three company areas and these into three platoon areas. Each platoon establishes a strongpoint in its area, organized for all-round defense with a width of 200 to 250 meters and a depth of some 150 meters. The strongpoint contains light machine guns and antitank rifles. Machine guns, mortars and guns are found in strongpoints situated farther to the rear. Between the strongpoints, dummy installations with machine-pistol forces are often scattered. The company commander remains in the company strongpoint during the battle.

Within the defense area of a battalion, a few strongpoints—for example, two company strongpoints, one platoon strongpoint and the strongpoint of the battalion reserve—are combined to form the battalion defense center. In terrain in which tanks are able to operate, this is, at the same time, an antitank defense center. If tanks are not able, or only partially able, to operate in the terrain, the company strongpoints may have no direct connection with one another. The intervals are 1,500 meters in extent, and are protected by means of machine-pistol forces and mine fields. It is a fixed rule that each company is responsible for the interval on its left.

In defense, the machine guns open fire at 800 meters, sharpshooters at 600 meters and rifle troops at 400 meters.

When enemy tanks take part in the attack, they are combatted by the artillery, antitank guns and antitank rifles, while machine guns, machine pistols and rifles lay their fire down on the accompanying enemy infantry, attempting to separate them from their tanks.

In tactical training of infantry, the mastering of the technique of swift and bold maneuver, but without losing contact with the supporting weapons is of primary importance. In breakthrough operations against permanent and deeply echeloned defense lines, the success of the operation is determined by the ability of the troops to advance swiftly and incessantly through the entire depth of the defense with the continuous support of its attached artillery and mortars.

Major General P. Tikhomirov, USSR

The Eighth Army—From Alamein to the Sangro

Digested by the MILITARY REVIEW from an article by Cyril Falls in "The Illustrated London News" (Great Britain) 6 March 1948.

IN 1946 Field Marshal Lord Montgomery printed privately an account of his campaigns with the Eighth Army in Africa, Sicily, and on the mainland of Italy. He wrote a similar book, for limited circulation, on his experiences with the Twenty-first Army Group, entitled "Normandy to the Baltic," which was made available to the general public some time ago; but the earlier book, "El Alamein to the River Sangro," could not, it was decided, be put upon the literary market until after the publication of Field Marshal Lord Alexander's dispatch on the campaign in North Africa. The volume now published is almost the same as its private predecessor.

The period covered is from 13 August 1942, when the writer took over the Eighth Army on the Alamein position, to 31 December 1943, when he handed over command of it beyond the Sangro, on the Adriatic coast southeast of Pescara. Its main features are thus the reorganization of the Eighth Army on taking over, the defensive Battle of Alam Halfa, the Battle of Alamein, the pursuit across the continent to the frontier of Tunisia with a number of advanced-guard actions on the way, the fierce fighting on the frontier, and the entry into Tunisia; then the brief but hard-fought Sicilian campaign; finally the landing in the "toe" of Italy, the advance along the "foot," the move across to the Adriatic side of the mountains; the progress up the coast across one deep-cut river after another, the ferocious Battle of the Sangro, and a certain disappointment that the race with the weather had not been won.

On arrival in Egypt the new Army Commander adopted a new defensive policy. Plans for future withdrawals were cancelled and the Army was told that if the enemy attacked he was to be fought on the present position. That meant a great change in dispositions and in administrative arrangements. At the same time, the former tactics of splitting up formations to create miniature forces of all arms was scrapped. It is only fair to commanders who had been responsible for them to acknowledge that they had used them because their strength and armament were inadequate; but even apart from that it would seem that there had been too much dispersion hitherto. Those who advocate the improvisation of small detachments often underestimate the disadvantages which go far to nullify the gains sought. Command, signals, and transport are designed and assigned for formations to fight as they are constituted. If a brigade group or reinforced brigade, with artillery and armor, is needed for a small campaign, it can be made efficient for its purpose; but then it is prepared in advance. Its staff is strengthened, its signal communications are adapted to its needs, its transport is reorganized, and if possible it trains as a formation. That is another matter. At the same time, Lord Montgomery brought to his task a deep fund of patience, not always characteristic of great commanders. He intended to win decisively, but he did not intend to be drawn into a premature encounter battle with an enemy whose German elements—and perhaps even the best of the Italians—were, to start with, better trained and more at home in the conditions than the great majority of his own forces.

As we look back on the Battle of Alam Halfa we may be inclined to dismiss it with the comment that the defense was very neat and made the most of the terrain, so that the result was almost inevitable. We should reflect how much strength of mind it took to fight the

battle as it was fought. The enemy stood at the door of Egypt. One short successful thrust would take him to Alexandria. There must have been a strong temptation to the British commander to interrupt his preparations in order to launch a spoiling offensive himself. The coolest and most determined man could not in such circumstances wholly expel from his mind the frightful consequences of defeat, the ruin of all the plans in hand. Waiting requires more nerve than the boldest attack. He waited. He foresaw with confidence that Rommel would come through between his left and the Qattara depression and swing northward to envelop the flank and roll up the front from south to north. Much, however, depended upon the angle of Rommel's wheel. Lord Montgomery here tells us that he hoped it would be narrow, against the Alam el Halfa ridge, which ran roughly at right angles to the front, starting some eleven miles in rear of it; but he had to make his dispositions to provide also for the possibility that the angle would be wider and that the advance would be east of the ridge and directed upon the coast about El Hammam. Rommel actually took the course which his opponent expected and preferred, but there is a good deal to be said for it from Rommel's point of view. If the Axis forces had ever got to El Hammam they would have certainly lost their communications, and as the theorist Hamley points out, though getting round a hostile army and sitting on its communications is much more spectacular than compelling it to form front to a flank, it is not necessarily more effective and may be much more risky. If the angle had been wider there would probably have been a battle to the death, which the Battle of Alam Halfa was not.

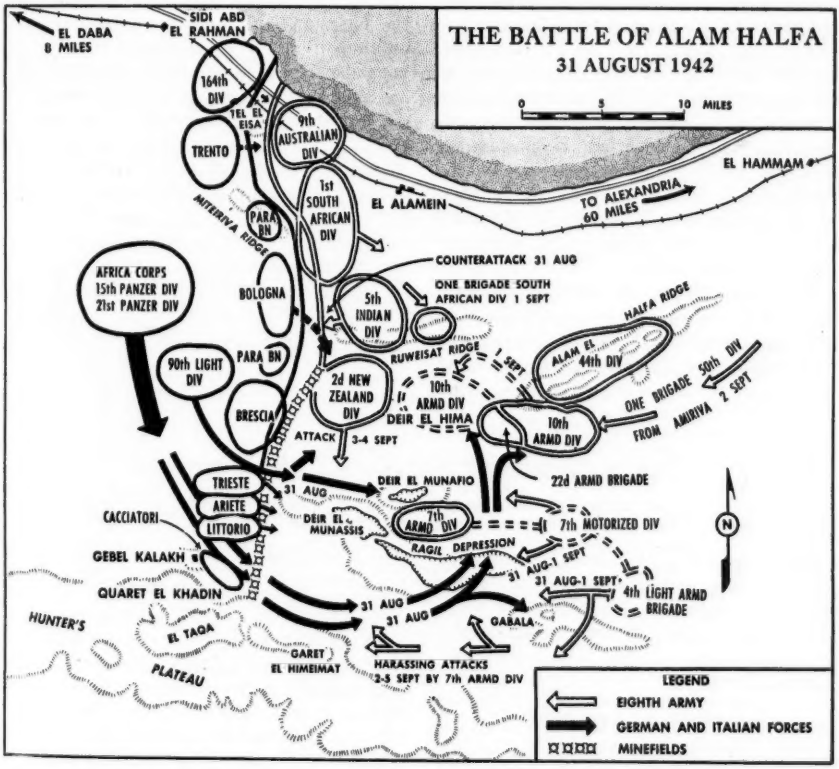
If Rommel's attack had succeeded, it would certainly have been cited by the text-books as the flank attack in perfection. The worst that could be said of it was that it was rather too like his earlier attack on the Gazala line. Here there was the outer wheel by his best armored forces, the famous German 15th and 21st *Panzer* Divisions; then pressure by three Italian divisions, *Littorio*, *Ariete*, and *Trieste* over several miles of frontage, though only *Trieste* established itself beyond the British mine fields; then a thrust by the German 90th Light Division. In the center of the British front a good Italian division, the *Bologna*, delivered a strong attack on the Ruweisat Ridge, and a considerable counterattack was required to expel it from the footing it gained on the western edge of this ridge. And on the coast there were attacks rather in the nature of feints. The criticism that arises in the mind is that it would surely have been wiser to put the two Italian armored divisions, *Littorio* and *Ariete*, into the wake of the German armored divisions instead of giving them independent sectors on the latters' left flank. They were probably not either sufficiently enterprising or well enough equipped to pass the mine fields by their own efforts, but they were not bad troops; *Ariete*, in fact, had a high reputation. Four armored divisions roaming on the flank on the first day would have been more embarrassing to deal with than two.

The battle itself needs no long description. The troops of the 7th Armored Division which first encountered the advancing Germans were driven back, as it had been expected they would be. The enemy could, however, effect nothing against the 22d Armored Brigade, which met him actually south of the ridge but on carefully selected ground. On the second day, 1 September, Lord Montgomery, now sure of his adversary's intention, was able to move his 10th Armored Division further west, into position between the Alam el Halfa Ridge and the Alamein line. Twice that day the *Panzer* divisions returned to the attack; twice they were forced to with-

draw south with heavy losses, the effect of which must have been heightened by the pounding of their communications from the air. This was the phase when many competent commanders would have launched a strong counteroffensive, not only against the force which had effected the penetration, but also from the main front.

awaited attack after the landings in French North Africa.

Therein appears the second example of the patience to which I have referred. Lord Montgomery was not going to be robbed of the prospects which he had sketched out for himself. He would permit no general counterattack from the main



What the result would have been can only be surmised, but there is little probability that there would have been a victory as great as that of Alamein—and there would have been no Alamein, since it would have taken a good deal longer to mount such a battle after a real "dogfight" in early September, and the enemy would not have

front. Even on the front of the enemy's penetration the counterattack was to be conducted "methodically and under careful control." And when he found that Rommel was determined to retain a last holding gained between the two belts of mine fields which he had penetrated, the British commander quietly decided to allow the enemy

the temporary satisfaction of doing so. "At 0700 hours on 7 September," he writes, "I decided to call off the battle and to leave the enemy in possession of the western edge of our original mine fields, organizing fresh positions for the Eighth Army on the western edge of them. There were definite advantages in keeping some additional enemy strength on my southern flank." It may be called further evidence of strength of will that a commander in chief naturally ardent, believing firmly in the old Clausewitzian doctrine that the battle decides all, should resign himself to an action which for the next six weeks would appear to all the world to have been supercautious. In fact, world opinion for six weeks hardly mattered, because the defeat of the Germans was so reassuring to the Eighth Army.

The inspired prophet, studying the Battle of Alam Halfa, might have foretold that the victor of that battle and the army which had prevailed in it—now far more confident in itself and having enjoyed opportunities for further training of the armored forces—would win the Battle of Alamein, though this would manifestly be a much more difficult and a more costly undertaking. If anyone considered, on the basis of Alam Halfa, that the British commander in chief was not one of those who are prepared to play for the big stake, he must have reversed his opinion, at least if he comprehended the hazardous nature of that offensive and its unpromising circumstances, even with air supremacy and a superior number of tanks. Yet even in that battle also, though a breach had to be blasted in the enemy's front by sheer frontal assault, Lord Montgomery did not forget the strain upon his troops or the need for avoiding excessive losses. But everyone knows Alamein, whereas few know Alam Halfa. That must be my justification for dealing here with the little battle instead of with the great.

The Intelligence Service of the Future

Translated and digested by the MILITARY REVIEW from an article by Lieutenant Colonel Achar-James in "Revue de Défense Nationale" (France) March 1948.

KNOWLEDGE of the enemy will always be required. In the atomic age, as in the past, each adversary will want to know where the enemy will act, when he will act, and how he will act, in order to protect himself as well as possible.

Intentions vs. Possibilities

Many generals have attempted, to their misfortune, to imagine what the enemy *intended* to do. Inevitable defeats have resulted from this. There is nothing to prove that the enemy has any intention, that his mind is made up, or that all the echelons of his command are of the same opinion.

With all these conditions fulfilled, it is still necessary that the enemy possess the possibility of successfully executing his intentions. And his intentions are always limited by his possibilities.

Experience therefore leads us to admit that it is always better to *calculate possibilities* than to imagine intentions. One must not confuse possibilities and probabilities. Estimating probabilities is both delicate and dangerous; the German attack through the Ardennes had been adjudged difficult but, also, improbable. The estimate of possibilities is effected by simple reasoning based on purely material and concrete data.

From the nature of the ground; the naval and air means, their number and initial location; and the facilities presented

by land and ocean surfaces and aerial spaces for movements, one deduces whether the enemy is in a position to attack or only to adopt a defensive attitude, in what directions he is able to act, and when he will be able to do so.

This reply to the question, when, is of prime importance. The time between the beginning and the end of an action is when the required counter-means are disposed. If the enemy needs no delay before beginning his action, it will be necessary to be permanently ready to reply to him. The Maginot line, for example, was ready at all times to receive a sudden attack. If, on the contrary, the enemy action requires delay, it will be possible to effect the required counter-means after the operation has started.

After the initial action, if the enemy has the choice between several possible maneuvers, should the counter-means be prepared for each possible maneuver? If they can be prepared simultaneously and without any delay, that should be done. But if the enemy is able to carry out only one, and some delay is required, the same means may be counted on for parrying all the maneuvers, but will actually be disposed only in accordance with circumstances.

It is obvious that the more time the enemy is given for acting, the more numerous will be the measures that he will plan to employ. But some delay is also required for the initiation of friendly action. It is, therefore, still the future enemy one has to take into account in plans, an enemy whose maneuvers must be calculated on the basis of the known initial situation.

It is important, therefore, to learn in time what action the enemy has chosen among all those possible to him and the moment it begins.

In order to accomplish successfully this task of reconstituting the present enemy, of constructing the hypothetical future enemy, and of determining the maneuver that is under way, we attempt to gather the greatest possible amount of information. Information reveals the possibilities.

Intelligence Sources

A modern enemy is vast and complex. In order to understand him as a whole, numerous means of investigation are employed: troops in contact with him give us his apparent position; aviation, by visual or photographic reconnaissance, attempts to gather information of the enemy in depth; secret agents attempt to gain possession of various documents; radio listening posts intercept communications, and by determining the location of transmitters reveal the disposition of the command. All possible sources of information are exploited.

Each bit of information gathered must be subject to a rigid check, and then transmitted to those especially interested in it without undue delay in order that necessary countermeasures may be taken.

Future Possibilities

As to future possibilities, we believe they may be classified into three main categories.

In the near future we shall certainly see means employed analogous to those of World War II: ground units, motorized and armored units, aviation and naval units, acting in liaison.

Thanks to technical progress, they will doubtless enjoy greater possibilities from the point of view of speed, power, and range. They will continue, however, to be limited by the terrain, from which it will still be possible to deduce the directions in which they are able to act. But their range and depth of action will continue to be limited. And their action will still require appreciable delays.

It will, therefore, still be possible to act on hypotheses and effect a timely adaptation of friendly maneuvers or counteraction to the enemy action. In-

formation may be gathered, transmitted and exploited under acceptable conditions.

Airborne units constitute the second category of possibilities. Their strategic flexibility is considerable. Air transportation knows few obstacles.

Against airborne units is their speed, which is still relatively low. Moreover, the dropping of paratroops and the landing of gliders is limited by the terrain. Practicable areas are easily determined by the defense. Night is unfavorable, at least for the regrouping of units and the location of equipment. Winds of more than ten meters are hazardous. There is, therefore, limitation both in space and time.

Aviation is moving, at the present time, out of these first two categories, characterized by appreciable delays in movement, and into the third category. This third category includes the very long-range projectiles and aircraft.

These projectiles know nothing of obstacles; they are in no respect subject to limitations due to terrain or weather conditions. It is impossible to limit the directions or the periods in which they will act. The utilization of atomic energy in place of explosives will provide them with enormous destructive power against which, perhaps, only underground facilities will provide protection.

They possess, fortunately, one weak point. The precision of self-propelled missiles is still very poor. But it is not impossible that one day we shall be able to place them anywhere on earth.

Effects of the atomic bomb on dispersed targets are not known. The bombs are extremely costly, and would seem to be destined for use against great centers. Also, residual radio-activity robs these weapons of all semblance of offensive characteristics. The mass arrival of atomic projectiles over a territory would be a clear sign that the enemy has no intention of invading.

In the face of these possibilities, the problem takes on an entirely different aspect. There no longer exist any delays except in preparation, but these may run into several years. When the weapon is ready, on the other hand, there is no delay in getting it into action. The problem can no longer be merely that of foreseeing the counter-means that are to be gotten into place in accordance with circumstances. The considerable possibilities as regards range, the unlimited possibilities in the matter of direction, the almost unbridled possibilities as regards the explosive power of these weapons, oblige us to be permanently ready everywhere. Hence, there no longer exist any hypotheses on which to base countermeasures. Admitting that intelligence may still be possible, will it be necessary or utterly useless?

Future Application

What may we expect to gain in the future from the usual methods of investigation?

Information gathered by the usual agencies will simply have to be transmitted more rapidly after having been obtained at greater distances. Improvements in and wider use of radio communication will solve the problem of transmission. But time must be saved in verifying and exploiting information, and broadening its employment.

Radar is an almost ideal solution since the investigating and transmitting agents are the same. Objects are not only detected, but localized and tracked. But radar still has a relatively short range, it is easily jammed, and it is not yet selective.

The oldest method of gathering information is, without doubt, ground observation. Up to recently, it has been limited by darkness and misled by camouflage. The Germans succeeded in perfecting an infra-red projector by which it is pos-

sible to see for a distance of 200 meters in the dark.

Air observation will find a new aid in television. The transmitting apparatus is now of a sufficiently reduced volume and weight to be carried in a plane. We may imagine each command post equipped with a "flying eye." The commander will have constantly before him on a screen a view of the field of battle, which will be both continuous and mobile.

Photography will serve for the detailed and thorough study of the situation at a given moment. Research here should be directed toward a reduction of the time required for developing, printing, and distributing the photos.

Special agents, prisoners and deserters will continue to be important sources.

As regards "professional" agents, they will first be subjected to tests. It will not be difficult to carry out their selection tests, bearing on their capacity for rapid observation, judgment and memory. This method cannot, of course, be applied to occasional informers. But studies are being made along the line of an electromagnetic check of the honesty of the declarations of a subject during interrogation. If success is achieved in this, we shall witness the disappearance of the double-agent, the terror of the special services.

Two difficulties mark the employment of agents: the crossing of the enemy's lines, and the transmission of information. The helicopter will soon provide a better solution for the first than parachuting as it permits picking the agents up again. Small radio sets capable of emitting a very narrow beam will constitute a good solution to the second problem. If the beam can be directed upward to a receiving plane, the risk will be reduced to a minimum.

As for airborne units, once on the ground they become sources of information of the classical type.

Aerial transportation lasts for several hours. It still leaves a certain latitude for getting counter-means into place on receipt of information. This will be supplied by special agents posted in the enemy's territory, and by radar. Although radar warns us of the approach of an air formation, it does not say what it is carrying—bombs or troops. One should, therefore, organize in all zones favorable for landing a ground observation network combined with a special signal communication network. Another solution could be the use of television planes. The transmission of all images to a central command post would permit rapid concentration of counter-means at the point where the attack was being made.

High-Speed Missiles

Finally, there is the third category of possibilities: ultra-rapid aircraft and long-range projectiles. In their case, there is no longer any delay. But it appears to me that the employment of counter-means may be anticipated.

With the proximity fuze, one merely fixes the trajectory and the fuze functions at the same time as intelligence agent and utilizer of the information. Having detected the target, it operates automatically. In short, it discovers the enemy, interprets the result in its own particular manner, and exploits this to the maximum. The gain in results is considerable.

The proximity fuze still requires human intervention to determine the location of the target. When we have projectiles or aircraft of very great speeds, this intervention will become impossible. We shall then be obliged to pass to the succeeding stage of automatic defense. The projectile, sent into the air in any direction, will be guided to its target. Increases in attack speeds will lead to a third stage of automatic warfare: that of the projectile which will guide itself

toward a moving target. Alerts will, in this case, require no human intervention. We may conceive of a system of radar detection, or a continuous infra-red barrier, maintained at a certain distance from the frontiers of the country, and acting directly to launching ramps. Only in this way will it be possible to parry the immediate possibilities of the enemy.

However perfect this method may be, it will doubtless be unable to halt all projectiles. These will possess a destructive power so great that they could be decisive, so they cannot be neglected.

Detection of radio-active materials will not indicate whether bombs or stores of material have been discovered, so a check will have to be made. A television projectile will be sent in the direction of the doubtful point, guided by an aircraft which will remain outside of the frontiers of the country that is being investigated. This method was employed by the Germans. The projectile, whose viewing apparatus will be set in action by radar, will transmit to the receiving station an image which can be photographed. Then, in order to insure secrecy of this method of investigation, a second device will destroy the projectile.

Scientific Information

Tomorrow it will be information relative to scientific activities that will be of main importance. First it must be determined whether there are enemy scientists and technicians able to conduct the scientific research and construct the highly delicate instruments that are needed. Iron, coal, and gasoline will no longer be sought, but, rather, small quantities of rare substances and the secrets of their transformation.

The agent of the future will have to be able to discern those things which, in the light of their scientific significance, are indices of the potential enemy's possibilities, and be able to interpret them.

At the end of this discussion, we are forced to admit that none of the principles followed in this field are obsolete. Processes and methods will only have to be adapted to the new possibilities that modern techniques give to the enemy. But these techniques also operate in favor of intelligence.

There is a gradual diminution of the significance of tactics, and an increasing significance of technique. It is possible to achieve decisive strategic results by means of actions in which only technique plays a part. Today, at least, we fail to note the appearance of any tactics of employment with reference to long-range, high-speed projectiles, and this gives intelligence its modern, scientific character.

The necessity which we have emphasized of discovering at its inception the manufacture of the new means of warfare will lead to an extraordinary development of all espionage service. On the other hand, every country which possesses or believes it possesses something that should be concealed will establish police protection consistent with the threat.

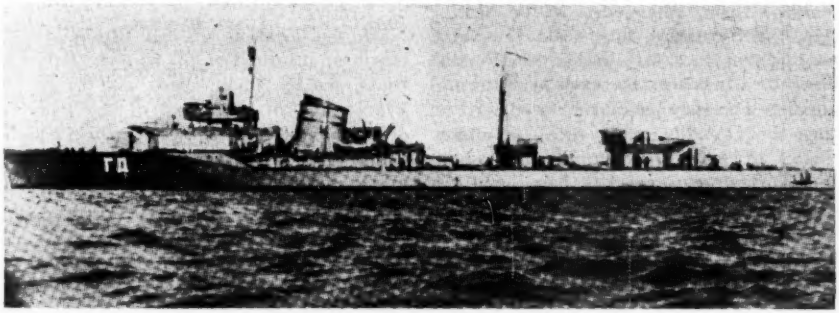
Above all, the peace of mind and the liberty of the average inhabitants of the world will suffer because of it.

But, again, it is at their inception that these possibilities must be destroyed. We see the consequences of this deduction. Every country, under the pretext of legitimate defense, will believe itself authorized to destroy the industry of any other country on the argument that there was some indication of a disquieting type of manufacture. Of course, that will be done without declaration of war or a period of tension, since the danger will always be immediate and almost impossible to ward off.

The Russian Navy

Digested by the MILITARY REVIEW from an article by Captain Russell Grenfell in "The Navy" (Great Britain) April 1948.

SOME people in Britain might be inclined to say the Russian Navy is of no importance in these days of atomic warfare. Indeed, there are those so hypnotized by the atom bomb that they can think of the future in no other terms: and even where a wider view is taken, the view is periodically expressed that the Russian Navy does not count as a strategical factor. Nevertheless, if only as an academic exercise, no harm can be done by having a look at the Russian fleet, so far as it is visible.



A Russian destroyer of the "Gromki" class.

The present Russian Navy is a bit of a hotch-potch. The bulk of the ships are Russian built; but there are also ex-German ships obtained after the surrender, and some ex-Italians are on the point of acquisition. Eleven are on loan from Britain and one is on loan from the United States, but these are about to be handed back in exchange for the ex-Italian ships.

The native-built ships comprise three battleships (*Pariskaya-Kommuna*, *Marat* and *Oktiabrskaya Revolutia*), all nearly forty years old, seven cruisers, of which three are ten to twelve years old and the rest much older, thirty reasonably modern destroyers and fourteen others, 150 ocean-going submarines and 100 smaller ones, besides torpedo boats and minor war vessels. The ex-German ships comprise the cruiser *Nürnberg*, six destroyers, and nine U-boats. The ex-Italian ships include the battleship *Giulio Cesare*, thirty-seven years old but reconstructed in 1937, one cruiser, and eight destroyers. The British ships on loan are the old battleship *Royal Sovereign*, seven destroyers, and three submarines; while the Americans have lent one cruiser. The total of ships from all sources is, therefore, four battleships, eight cruisers, sixty odd destroyers and 250 submarines. These are minimum figures based on the ships individually known to be in the Russian service when anything like reliable information was available three or four more years ago. It is quite possible the number is now larger through recent additions. Even if their main building yards were de-

molished or damaged during the war, it would be surprising if the Russians had not recovered some time back the ability to turn out small craft, and especially submarines. It was reported many months ago that a German U-boat building plant was being transferred wholesale into the Russian zone, and that at least 4,000 submarine technicians and designers had been sent to Russia.

The strength of the Russian surface Navy cannot, however, be measured by the total of its constituent vessels since some of them, amounting to one battleship, three cruisers, four destroyers, and some submarines, are locked up in the Black Sea whence, by existing international rules they cannot emerge. It is true that by the same rules no other Navies except the Rumanian, Bulgarian and Turkish can get at them; and as Rumania and Bulgaria are both safely tucked under Communist influence and the Turkish surface fleet consists of one battle cruiser, two very old cruisers and four destroyers, the Russian Black Sea contingent should have nothing much to fear. It is, therefore, somewhat interesting that very recent press reports say that the Italian battleship *Giulio Cesare* is to be surrendered at Odessa, thus confining her beyond the Bosphorus barrier. All the other Russian surface vessels are believed to be in the northwest (Baltic or Arctic).

Of the location of the Russian submarines, information is sparse. Seventy boats, mostly small, were said to be at Vladivostok in 1939, and of the remainder it may be wisest to divide them equally between the Baltic and the Black Sea, giving ninety to each area.

Norway's Home Guard

Translated and digested by the MILITARY REVIEW from an article by First Lieutenant Herbert Alboth in "Schweizerische Allgemeine Militär Zeitung" (Switzerland) April 1948.

WITHOUT a single shot being fired at them, German troops, in April 1940, succeeded in gaining a foothold at many points along the Norwegian coast. Relatively small forces seized possession of Oslo, Bergen and other coastal cities. Small detachments and patrols travelled unimpeded far inland and seized possession of the supplies and depots which the Norwegian Army, subsequently mobilized, was obliged to do without. Without being hindered to any extent worthy of mention, German planes landed at Norwegian airdromes.

Norway learned the necessary lessons from these events and is determined, by the help of all her means, never again to exhibit military weakness which could be regarded as an invitation to invade her country. The Norwegians know today that they must prepare themselves for repelling an enemy attack on their country, either on the coast or in the interior. Norway is creating, therefore, in accordance with her new defense plan, the forces best prepared to meet the new requirements: The Norwegian Home Guard.

We learn the following with regard to these forces from "Militaer Orientering," the army publication of the Norwegian Department of National Defense:

Organization: The Home Guard forms a part of the Norwegian system of national defense. It is under the orders of the army high command. The central command consists of an inspector general and staff. In the outlying districts, the local regiments are responsible for its command. In each regimental district,

a Home Guard officer (major) is appointed. The district is divided into three areas and at the head of each an officer (captain) serves as Home Guard commander. These areas are again divided into sectors, the majority of which correspond to a community. Large communities are divided into several sectors and smaller ones constitute a single sector. For each sector, a chief in the grade of Home Guard lieutenant is appointed.

The Home Guard of a sector is divided into groups, platoons and companies. Persons of the same village, of the same street or industrial plant, are to be in the same detachment. The detachments (from group to company) appoint their commanders themselves. In each district, a Home Guard district council is formed by the representatives of non-political organizations. From among the representatives of the same organizations, a national council is also appointed. The mission of this organization is to create the best possible contact between the nation and the army.

Every Home Guard detachment receives a number, in addition to which it may bear the name of its locality or industry. The most important requirement is that the Home Guard formations may be mobilized in the shortest possible time.

Missions: The mission of the Home Guard comprises everything connected with the defense of its own locality. Special Home Guard missions are: the combat of espionage and sabotage; the eventual combat of airborne forces; interference with or prevention of enemy landings by way of the sea; interference with or prevention of enemy movements; the construction and defense of obstacles across roads and railway lines; guard and defense of important civil and military objects; service as guides for other army formations; cooperation with the other portions of the army in the event of a large enemy invasion by partisans and sabotage activity; guarding of airdromes; the manning of minor coastal batteries and their protection from the land side; guarding of prisoners, interned persons and deserters; assistance in evacuation of residential sections; handling of liaison, supply, and medical services.

Training: All practice exercises, as far as possible, are carried on in the home areas of the Home Guard men. Among the fundamentals are: instruction in, and care of, arms; target practice; the use of explosives; military sports (orientation and obstacle races, etc.); instruction in the fundamentals of tactics. In addition there is special training of certain groups along the lines of their special mission during mobilizations and in case of war. Only enough practice exercises are engaged in to insure operation in close formations.

Recruiting: Men liable for the military service of the classes of 1940-44 (45), and who have, as yet, not been in the military service, are liable for service in the Home Guard. For others, participation for the time being at least is voluntary. Unless engaged in other military service, all Norwegian citizens over 17 years of age may be members of the Home Guard. The requirement is that they be fit, physically and mentally, for discharging one of the missions of the Home Guard.

Men who are liable for the regular military service may take part in the exercises of the Home Guard in order to keep up and increase their military skill and knowledge.

Service Liability: The volunteer Home Guard man is required to engage in a minimum of fifty hours of training yearly. For those liable for Home Guard service, the minimum is 120 hours. To this is added the time required for obtaining proficiency in the use of fire-

arms and acquiring physical fitness. For the present, the training exercises do not occur during working hours.

Weapons and Equipment: As far as the supply will permit, the Home Guard soldiers will be equipped with the Krag-Jörgensen rifle. Later, they will be provided with a few types of automatic weapons. In the interests of rapid mobilization, the Home Guard men keep both weapons and equipment at their homes or in street and quarter arsenals. The Home Guard will also be gradually supplied with its own uniform. For the present, every Home Guard man wears an arm band. Helmets and other objects will be steadily delivered to them as they are manufactured.

Collaboration with Civil Organizations: Through the Home Guard Council, effort is made to establish direct cooperation with a large number of civil organizations. Prominent among these are rifle associations, sports associations, womens' organizations and medical organizations. The Home Guard men receive their first firing practice in the rifle associations. Greater government aid is, therefore, accorded this latter association.

Home Guard publication: A special periodical is published for the cadres and men of the Home Guard. It is the mission of this monthly periodical to further the contact between the Home Guard headquarters, the district and area commanders, and the individual Home Guard men in order that the Home Guard organization, which covers the entire nation, may be ready for service as quickly as possible and become a valuable part of the new defense organization.

Norway's Home Guard has taken over a few features of the Swedish system. A number of things also resemble experiences of the Swiss *Ortswehr* (local guard forces). That the character and structure of the new organization are much to the liking of the Norwegian character is evident from the fact that 100,000 volunteers responded to the first call.

Why Singapore Fell

Digested by the MILITARY REVIEW from an article by Admiral Sir Gerald Dickens in "The Navy" (Great Britain) May 1948.

FEW of the many published comments on the dispatches which announced the fall of Singapore to the Japanese give the real reason for the fall of this great fortress, with its heavy guns and considerable garrison. And yet the answer is a simple one. The overriding reason was our lack of sea power.

Singapore and Hong Kong were snatched from us, Australia and New Zealand were left dangerously exposed, and the Dutch East Indies (which, incidentally, have for the last century been immune from attack by virtue of British sea power) overrun because, to our disgrace, we had allowed the Fleet to get so weak that it could not carry out its function of sheltering and protecting this large portion of the Empire and other vital interests in the Far East.

Singapore was a naval base of great importance; hence the fortress, but the history of sea power shows that a detached fortress must not be left to depend on local defenses alone. Every fortress that becomes isolated is bound to fall. A base without a fleet, as we have seen at Singapore, is a mere hostage to the enemy. Why is that? There have been sieges of our fortresses before, e.g., Gilbraltar, and the place held out for years. There you have the answer. They held out because we had the necessary sea power which enabled us

from time to time to send in reinforcements, munitions and food, and to interfere with enemy attempts to support their attack from seaward.

The Air Factor

It may be said that had we enjoyed more local air power we might have defeated the enemy attacks at Singapore and Hong Kong. That stronger air forces would have made the enemy's task far more difficult and caused him far greater losses is obvious, but unless these forces were strong enough not only for local defense, but also to keep open our sea communications over a huge area, and close down those of the enemy, the result would have been the same in the end. Air forces alone, however, cannot carry out the latter function if the other side has sea as well as air forces. In any case, the air (largely provided by carriers, i.e., naval aviation) would be merely one of the weapons making up our sea power, for the reason that relief for our garrisons, as well as for the local air forces, have to come mainly in ships over thousands of miles of sea.

The same applies to the enemy, whose troops and stores would equally depend on ships. All this in no way belittles air power, but it shows not only that, alone, it cannot control sea communications, but that its primary task in the case of a maritime country such as ours is to fight for sea power. In places such as Singapore and Hong Kong, very large air forces are impossible due to restricted space for air fields and, therefore, constant reinforcement of aircraft, men and materials must be provided; most of which, to repeat, must come in ships.

An aerial view of Singapore docks.

Japanese Operations

Let us now see how the Japanese staged the quick campaign that brought about the downfall of one of Britain's most important strategic bases. Japanese territory was too far from Singapore to allow direct invasionary attack. The Japanese, therefore, decided to seize a nearer base, so they swooped on Camranh Bay, in Indo-China, a fine natural anchorage, and established themselves easily enough there.

It was surprising to read in one of the big London dailies that this move could hardly have been expected, for it was the most orthodox piece of strategy and one which any High Command might expect—especially as it was so easy, France being absolutely powerless. From this base, the whole Japanese fleet, with its strong air component, could obtain the necessary command of the Gulf of Siam and thus furnish safe passage for the transports across this short stretch of water. We had practically no naval forces and the United States made no move; instead, they were themselves attacked by Japan and so hamstrung temporarily that they were powerless to act in the Western Pacific.

Then came the *Prince of Wales* and *Repulse*—a new battleship and an old battle cruiser. A gesture of despair which sent them to the fate which might have been expected. Not only could the Japanese confront them with an overwhelming number of battleships, land and sea airborne forces, but our two capital ships had to go into action with no attendant carriers and no cruiser or destroyer screens.

Naval Weapons

It is most important that we study the chain of events which led to the appalling state of naval weakness in which we found ourselves. In 1919, Lord Jellicoe, after a tour of the East on which he had been sent by the Government, submitted a very clear appreciation on the permanent measures to be taken in view of Japan's growth as a sea power, to safeguard Australia, New Zealand, India and our interests generally in the Far East. He recommended an Eastern Fleet, which should include sixteen battleships, and that this fleet should have a strong base at Singapore. The proposal for a base was accepted, but the proposal for a fleet was rejected. A base without a fleet! As much good as a sentry-box without a sentry!

It is to be supposed that the Government at the time hoped vaguely—as governments are apt to do—that some day ships might appear from somewhere. Actually, the Government in 1921 fell back on a One Power Standard, a meaningless formula as it did not express our actual security needs. From this we see that the fate of Singapore dated from 1921. But worse was to follow, for as the threat of a new war with Germany grew and nothing was done to build up our navy, such naval forces as we had been able to maintain in the Far East had to be withdrawn to meet the menace in the West.

From this tragic story we can, and indeed must, learn several lessons, of which the more important seem to be:

(1) So long as the Empire remains, we must be able to guard all our main sea communications. A heavy burden, but the price of Empire. As a matter of fact, the Mother Country's share of the burden should steadily decrease as time goes on and the Commonwealth nations increase in population, productive capacity and wealth.

(2) Whenever a Government shows signs of reducing the Fleet we must insist on public announcement of what is proposed and why before any action is taken. We must never permit ourselves to be lulled by protestations to the effect

that cuts are merely temporary and that soon our navy will be stronger than ever before. We must watch these situations carefully. The new Home Fleet-to-be may be all that has been promised, but that must not divert our zealous watching. We shall want to know if it is the balanced fleet we need, if the squadrons of cruisers, destroyer flotillas, naval aviation, submarines, minesweepers, coastal craft and so on are available and ready to protect our sea communications, long before any definite threat of war occurs. We should like to know whether our foreign squadrons can meet even the commitments of peacetime.

(3) We must never let ourselves be dependent on any foreign power for our basic security. We hope that in any big war we and the United States will be found on the same side. But we can never be certain that America would necessarily join us at once, if at all, in any war. Circumstances change, and in a comparatively few years we might find ourselves embroiled and the United States, for perfectly good reasons of their own, might not see fit to throw in their lot with us.

Principles of Modern Warfare

Digested by the MILITARY REVIEW from an article in "The Royal Air Force Quarterly" (Great Britain) January 1948.

PERHAPS it is too early to enunciate the lessons of World War II, but the commanders of the British sea, land and air forces are even now busy collecting and recording the data upon which those lessons will be based, and from time to time they indicate some of the trends of professional thought to these matters.

As was to be expected, the fundamental principles of war remain unchanged, and in particular that which says that warfare is essentially a method by which the will of one nation is imposed on another nation. There are other ways in which one nation can impose its will upon another nation, *e.g.*, by diplomacy. And as it has been said that war is only diplomacy carried out in another sphere, *i.e.*, on wide battlefields, so diplomacy may be said to be war carried on, without bloodshed, in chancelleries and embassies.

Equally unchanging are the three stages of warfare, all of which must be completed, though the order of their completion may be varied. These three stages are: the destruction of the enemy's armed forces, the occupation of his territory, and the submission of his government.

Among those who have recently pronounced upon the principles of war is Field-Marshal Lord Montgomery. They are reproduced below, with comments.

"1. *The master principle is sound selection of the aim to be sought and steady maintenance of that aim.*"

This needs no elaboration, and its application to air operations is obvious. But circumstances may arise in which a change of aim is necessary, and then a too rigid adherence to plan may be disastrous, as is indicated in Point 8, below.

"2. *Success in war depends more on moral than on physical qualities.*"

Various estimates have been made, by the great captains and by historians of war, of the relative importance of the moral and physical qualities; and any expression of their relationship in terms of mathematical units must be arbitrary and deceptive. Lord Montgomery wisely contents himself with giving precedence to the moral qualities; and none has paid

more attention to the morale of his troops.

"3. *Offense is the necessary forerunner of victory; while it may be desirable to postpone it, without it victory is impossible.*"

It must be obvious that no war can be won by sitting down and waiting for the enemy to attack, even though you may be able to beat off his attack. Successful defense is not victory but a denial of victory to the enemy.

"4. *Security is essential to freedom of action; this does not imply undue caution, but on the contrary encourages boldness and vigor.*"

The word "security" here needs careful interpretation. It does not mean freedom from loss or attack; for a force operating "with boldness and vigor" is inviting attack and some loss, both of which are inseparable from the bringing of the enemy to battle. Security here means security against surprise and against attack from an undersirable direction, and this is implied in the phrase "freedom of action." It also means insuring the maintenance of the initiative.

"5. *Surprise brings results out of all proportion to the effort expended.*"

If the advantage of surprise is obvious, the means whereby surprise is achieved may not be. The long and careful planning that is necessary before even a small operation renders the most careful security measures necessary over a period which may be long or short according to the magnitude of the operation contemplated. Surprise can be achieved, however, not only by denying information to the enemy (the negative method) but also by the positive method of giving the enemy false information.

To surprise the enemy is to exploit both his relative weakness at the point of attack and the time which must elapse before he can bring his whole force to oppose the attacker. Thus a surprise operation may be carried out successfully with far fewer ships, troops or aircraft than would be necessary in an operation which the enemy expected, and the tactical advantages gained are out of all proportion to the cost in men and material.

"6. *Concentration of force at the decisive time and place is a prerequisite of success; it may not involve massing of forces but rather so disposing them that they can unite for the blow where and when required.*"

New weapons render all concentrations vulnerable, yet they remain tactically necessary; concentration should, therefore, be as swift and as secret as possible. This explains the need for judicious strategical and tactical disposition of forces. Air forces, much more than sea and land forces, are able to concentrate rapidly and effectively at any point from widely separated bases; and for that reason are less vulnerable and better able to achieve a surprise attack.

"7. *Economy of effort implies a balanced employment of forces.*"

Modern warfare is so much a science that it is possible to compute with a high degree of accuracy the size of the force required for the successful performance of any given operation and the proportions of its various components. Economy of effort, therefore, implies a balance of forces and not reduction to a minimum. Many offensive battles have been lost because the commanders embarked upon them with too small forces; and one more ship, one more division or one more squadron of aircraft might sometimes have turned the scale. The wise commander insists on a certain superiority, numerical, mechanical or tactical (and perhaps all of these) before he embarks upon an offensive operation; and he satisfies himself beforehand that his objective is not only attainable but is well within the capacity of his force to attain.

"8. *Flexibility is needed in modern war to enable plans to be adapted to changing situations.*"

So great is the speed with which operations of war are conducted today that flexibility is of the first importance. The situation may change at any time and a commander must be able to divert his force from a planned objective to exploit an unexpected circumstance, and even to change the functions of the components of his force and their relative proportions. This calls for considerable education and intelligence in the personnel and careful training in adaptability.

"9. *Cooperation, based on the team spirit, entails the coordination of all forces to achieve the maximum combined effort.*"

The importance of cooperation, again, needs no emphasis. Effective cooperation, like adaptability, depends upon education and intelligence; it also requires that each part of a force shall know and understand the commander's intentions and what the other parts of the force are doing. Hence the need for taking the individual sailor, soldier or airman into the commander's confidence. Lord Montgomery insisted on having his plans explained to the rank and file before going into action; and this he did, not only to raise their morale, but also to make cooperation more effective. Modern navies, armies and air forces consist of well educated and highly intelligent men, and they must be treated appropriately.

"10. *Administration must be designed to give the commander the maximum freedom of action, and every commander must have a degree of control over the administrative plan corresponding to the scope of his responsibility for operations.*"

The administrative and supply services must always be the handmaidens of the fighting formations, and the commander must control all three. Particularly important is it that subordinate commanders shall have sufficient control over their ancillary services. The wise commander will, however, be careful to consult his administrative and supply staffs when planning operations, and to insure that he does not attempt any operation which is beyond the capacity of his ancillary services to support.

To these ten points must be added one other, which the experience of World War II has shown to be as important as any. Lord Montgomery has repeatedly said that no major operation of war can be successfully performed until the air battle has first been won. And this applies as much to naval as to land operations. All major operations of war are, therefore, combined (joint) operations. The gaining and maintaining of air superiority is the first duty of the air arm, which thus becomes the first line of offense as well as the first line of defense. Its second duty is to assist the sea and land forces by providing direct air support. But this must depend upon the weather. Sea and land operations should normally be independent of air support which, if given, should be regarded as a "bonus," especially if time is an important factor. When fire support from the air is essential, suitable weather must be awaited.

Not the least important of the lessons that have been learned from the recent war is the way in which combined (joint) operations should be carried out. There was marked weakness in this respect during World War I. Ideally the three services taking part should be as closely coordinated as the units of a fleet, of an army, or of an air force. This can be achieved only by the most careful and detailed planning and by insuring that the detachment of each service fully understands the function and methods of each of the other two. Planning for combined (joint) operations must be longer and more detailed than for any other form

of military enterprise because control is so limited, indeed in some phases non-existent; it is impossible in a short-range combined (joint) operation to make alterations in dispositions at any stage of the voyage and equally impossible to accelerate the build-up. Hence, training for combined (joint) operations must now be a normal part of peace time training for all British forces.

Coastal Command in the Victory in Europe

Digested by the MILITARY REVIEW from an article by Air Vice-Marshal A. B. Ellwood in the "Journal of the Royal United Service Institution" (Great Britain) August 1947.

THE invasion of Europe has been rightly recognized as the greatest Combined Operation of all time. It was the shining example of successful cooperation between land, sea, and air forces; of the process of combined planning from the broad strategical conception down to the smallest tactical detail; of the triumph of secrecy and deception in the execution of a project of which the imminence was, nevertheless, as well known to our enemies as to ourselves.

The jealously guarded secret of the area of assembly, route, and destination of the invading forces is now common property. This area was commonly known as "The Spout." The task allotted to Coastal Command was to protect this area and the sea approaches to the point of assembly—to hold the ring, as it were—against indentation by enemy underwater and surface attack. The Command had, therefore, two distinct roles, namely, the attack of the U-boat and the attack of surface craft. The technique of these two roles being widely different, it was necessary to employ entirely separate squadrons for the performance of each.

Planning

During February and March numerous meetings and discussions took place between the staffs of Coastal Command, the Air Ministry, the Admiralty, the Naval Commander in Chief, and the air element of the Expeditionary Forces, the outcome of which established the following conclusions.

It was considered that the main threat in the initial stages would be from the U-boats. The danger lay, first, to our convoys sailing from the Bristol Channel along the coast to the assembly area and to a lesser extent to those sailing from the east coast through the Dover Straits; and secondly at a later stage, to the assault and build-up convoys during their passage to the French coast. It was agreed that the U-boats' most likely approach to the Channel would be through the southwestern approaches and that the threat on the east was a relatively small one so far as U-boats were concerned.

It was estimated that the enemy would be in a position to use 130 U-boats at the outset and a further seventy in reinforcement by D-day + 14.

The main effort of our anti-U-boat operations was thus to be focused in the southwest. But we could not afford to ignore completely the continued need to give a measure of protection to our Atlantic convoys, so it was decided to deploy a drastically reduced force on the west coast for this purpose. Nor could we neglect entirely the movement of U-boats through the northern transit area between the Norwegian coast and the Atlantic. To deal with this contingency we planned to retain sufficient aircraft in

Scotland and Iceland to provide thin cover in this area.

The secondary threat lay in the enemy's destroyers and light surface craft. This was expected to develop principally from the eastward of the invasion area, the bulk of the enemy forces being concentrated, according to our intelligence, in the North Sea and Channel ports. A smaller number of surface craft based on the French Atlantic ports from Brest to the Gironde were expected to operate in the southwestern approaches. The disposition of our anti-shipping forces was therefore planned so as to provide the main effort in the east. By April the planning was complete and the Commander in Chief issued his directive.

Battle with the U-Boats

The enemy made a determined attempt in May to reinforce his U-boat fleet in the Bay of Biscay by moving large numbers of boats from Norway. This move was detected on 16 May, and No. 18 Group reinforced by squadrons from No. 15 Group, and Iceland, immediately took the offensive. These operations profited by the enemy's anxiety to make his passage with all possible speed, and from the almost continuous daylight which persists in these latitudes at that time of the year. Added to this was the fact that few of the U-boats had as yet been fitted with the *schnorkel*. They returned to their old tactics of trying to force their way through on the surface, relying upon their antiaircraft guns to fight it out with attacking aircraft.

Throughout the rest of May there were almost continuous sightings and attacks and, after a short lull, the enemy, on D-day, sent out his remaining operational U-boats in southern Norway, some destined for the Bay of Biscay and some to maintain a defensive line off the Norwegian coast to guard against a suspected Allied landing in those parts.

All through June and up to mid-July fiercely contested actions took place from the southwest coast of Norway up to a latitude of 70° North, where the enemy tried to work round into the Atlantic out of range of our aircraft.

During this period—mid-May to mid-July—seventy-five U-boats were sighted and fifty-one attacked. Eighteen were sunk and nine seriously damaged. Nine of our aircraft were lost and many more suffered severe damage and crew casualties from the U-boat flak.

These early anti-U-boat operations in the north augured well for our prospects in the area of the main battle in the southwestern approaches. Here the limited size of the area to be covered and the numbers of aircraft at our disposal made it possible, for the first time, to design our patrols on the exact pattern which scientific research and planning had established as the nearest guarantee against the passage of a U-boat through a specified area.

We had only two anxieties. One was the extensive use of the improved U-boats and equipment of which we had heard so much.

The other anxiety was the fear of serious interference by enemy fighters with the anti-U-boat aircraft operating close to the French coast.

The final preparations for the Invasion assault and the large-scale rehearsal exercises at the end of May produced no marked reaction on the part of the U-boats in the Biscay ports, but on D-day they reacted promptly and strongly. Out they came—helter skelter; forty of them. Again they threw caution to the winds. Some made direct for the Channel, some to waiting areas in the southwestern approaches, and others to form a defensive line against a possible Allied assault on the Biscay coast.

During the period 6-10 June, Coastal Command aircraft sighted thirty-six U-

boats and attacked twenty-three of them—all on the surface and sixteen at night. In every case the U-boats stayed surfaced and fought back fiercely. Six were sunk outright and five were so badly damaged that they had to put back to harbor. Not one U-boat succeeded in reaching the convoy lanes or the assault area during this vital period.

The onslaught of Coastal Command's aircraft compelled the U-boats once more to revert to diving tactics. After 10 June only those fitted with the *schnorkel* attempted to interfere with our convoys. A few managed to penetrate the central Channel area and a few operated close inshore off the Cornish and Devon coasts, but their successes were negligible.

By mid-July the U-boat threat to Invasion operations was virtually over. As our armies swept towards the Biscay ports the U-boats prepared to get out, and on 15 August a general evacuation started. Fully operational boats were sent into the western approaches, the Bristol and North Channels, and the Minches. The rest set out on the long trek to Norway, keeping well out in the Atlantic.

In the whole battle in the North and South from 16 May to the end of August, Coastal Command aircraft sank thirty U-boats outright, shared five more kills with the Navy, and damaged twenty-six U-boats. For these successes we paid the price of a total of sixty-nine aircraft, forty-five being lost in action with the enemy and twenty-four through the hazards of maintaining our patrols consistently in fair weather and foul.

Of all the hundreds of vessels which took part in the invasion expedition and its maintenance the U-boats succeeded in sinking only nine ships and damaging seven.

Anti-Ship Operations

Soon after the initial assault the enemy attempted to bring his destroyer force based on the French Atlantic ports into the battle area. Three destroyers were attacked by a force of *Beaufighters* from 19 Group, south of Brest, on 6 June. This attack delayed their progress for two days in Brest and on the night of 8-9 June, after resuming their journey, they were spotted and reported round the Brest Peninsula by our aircraft, intercepted by a naval force and brought to action. One was sunk outright, one forced on the rocks and the third driven back to Brest. This saw the end of the enemy's attempts to reinforce from the west, the only two remaining destroyers being withdrawn to the Gironde.

In the battle area E-boats, of which there were about thirty based on ports between Boulogne and Cherbourg, were very active. Frequent attacks by *Beaufighters*, *Albacores*, *Avengers* and *Swordfish* were made, mostly at night. Against these small fast-moving targets it was difficult to achieve conclusive results, and definite sinkings could not be claimed in great numbers. It was obvious, however that our harassing attacks were having the effect of completely upsetting the enemy's offensive plans and his E-boat operations were rendered virtually ineffective.

Attacks also took place on enemy minesweepers and armed trawler escort vessels, and the *Wellingtons* did useful reconnaissance work at night dropping flares and directing our own naval forces to located targets.

It was not long before the threat of serious interference by enemy surface craft could be regarded as relatively negligible, and it was soon possible increasingly to turn our attention to the attack of German coastal shipping. Our anti-shipping squadrons were accordingly re-deployed, the majority being directed to the attack of convoys off the southern coast of Norway and the coast between Germany and Belgium. Only one *Beau-*

fighter squadron was retained to share with the *Swordfish* and *Albacores* protective duties in the Channel area.

The *Mosquito* squadrons in the west were now being equipped with rocket projectors and they, in conjunction with a flight of *Mosquitos* armed with 6-pounder cannon made numerous successful attacks against small convoys and minesweepers along the Biscay coast. During July six merchant vessels and fifteen light naval craft were sunk and a further fourteen seriously damaged.

At the beginning of August the southerly advance of our land forces led to an attempt by the enemy coastal craft to seek the comparative safety of easterly ports. By the end of August nine merchant vessels and twenty naval craft, including the two surviving destroyers in the Gironde, had been sunk. During the three-month period from D-day the anti-shipping squadrons sank eighteen merchant vessels and thirty naval craft and seriously damaged another thirty-six. For these losses the enemy received a small return. E-boats sank only four ships and damaged seven others, and mines accounted for eight ships sunk and fifteen damaged.

From now on we were able to turn our attention almost completely to enemy shipping off the Dutch and Norwegian coasts. Five squadrons—three *Beaufighter* and two *Mosquito*—were moved to Scottish bases under No. 18 Group, the remaining two *Beaufighter* squadrons being retained in Norfolk in the 16 Group area. In both these areas we returned to our tactics of attacking in large formations, and the success of these attacks soon compelled the enemy to move only by night and to lie up by day in protected harbors or isolated fjords.

In the 16 Group area it was found possible to attack the convoys as they formed up just before dark outside the harbors or as they entered harbor at daybreak. By October these tactics had had the effect of stopping almost all movement of German shipping along the Dutch coast.

On the Norwegian coast our main effort was concentrated upon the daylight attack on ships in the small land-locked anchorages where they were taking shelter. For these attacks aircraft known as "outriders" were used to lead the main formation to the target. The outriders were manned by Norwegian crews whose special knowledge of the area enabled them to fly ahead of the main striking force, find the target, and return to meet and guide the wing in to the attack.

In all daylight attacks an essential element of the striking force was the provision of protection against enemy fighter attack. The distance of the targets on the Dutch coast made this a comparatively easy matter, but in the north it was only possible by the use of long-range *Mustang* aircraft. In the days when no fighters were available our anti-shipping aircraft, which were no match for the enemy fighters, had to restrict their operations to conditions which provided low cloud cover. These conditions, although suitable for the attack of targets in the open sea, completely precluded that of shipping in the fjords owing to the height of the surrounding mountains. Once, however, the fighter protection was available, it was possible to attack shipping in all positions and in all conditions of weather.

Another method of attacking shipping at night was developed by two *Halifax* squadrons which had previously been used against the U-boats. These squadrons developed a technique of attacking by the light of flares after detecting their targets by radar.

By December the offensive in the southern part of the North Sea had become restricted to action against light naval craft. It was by this time possible to make use

of advance bases in Belgium and patrols were designed to bottle up the enemy in the Hook and Ijmuiden areas.

In March a new type of target presented itself in the shape of the midget U-boat. This was a small and difficult target to find, but in spite of this, fifteen of them were destroyed by *Beaufighters* and *Swordfish*, and it is possible that a further nine were destroyed.

In the north, as the tactics of attacking shipping in defended harbors and remote fjords developed, the scale and frequency of operations increased with improving weather and lengthening hours of daylight. By April the introduction of long-range drop tanks enabled us to supplement the night operations of the *Halifax* in the Kattegat by a daylight offensive by *Mosquitos* in this area. The result of all this anti-shipping activity, to which must be added the operations of our own submarines along the Norwegian coast, was that enemy sea communications were completely disorganized.

The Last Phase

Apart from a short burst of activity at the end of September when U-boats were returning to the Norwegian coast, there was relatively little actively in the anti-U-boat war for the next few months.

The loss of the Biscay ports had restored the situation of early 1940. The introduction of improved equipment to warn the U-boats of detection by aircraft radar and the increasing use of the *schnorkel* had to a great extent relieved the U-boats of the constant fear of air attack, but the limitations in speed and mobility imposed by the *schnorkel* made large-scale operations against Atlantic convoys impossible until the new U-boats with their greatly increased under-water speed could be brought into operation.

Operations by U-boats were, therefore, restricted to the use of the standard type of U-boat in patrol areas close inshore around the British Isles, special attention being paid to focal points of traffic. In these operations the *schnorkel* proved a valuable asset to the enemy. The number of U-boats in inshore waters was gradually increased until by the end of February, 1945, thirteen were in position around our coasts. During the three months December to February, U-boats succeeded in torpedoing a total of fifty-five ships, thirty-seven of which were in home coastal waters.

This period also saw attacks by our *Liberators* on the training and exercising areas for newly commissioned U-boats around the island of Bornholm in the western Baltic. These attacks were made at night and involved a round flight of 1,500 miles. Fourteen U-boats were attacked, and although none was sunk the enemy could no longer feel that his training areas were safe from air attack. Night patrols were also extended to the Skagerrak and Kattegat and the Belts.

By the end of April, in spite of heavy losses, there were signs of renewed vigor in the U-boat operations. At this time the number in inshore waters had increased to twenty. Five were in overseas positions, forty on passage—some in mid-Atlantic—and twenty in Arctic waters. Fortunately the new long-range fast types of U-boats never became operational owing to various troubles, although forty were by this time in commission. The new short-range types did make their appearance off the east coast of Scotland in March, but there were only fifteen operational by the end of April.

During March and April, forty-four ships were torpedoed—a larger number than we had become accustomed to over a comparable period for many months. But the U-boat sinkings increased in proportion: forty-five were sunk—fifteen by Coastal Command aircraft, the other thirty by surface forces. The increase in air sinkings was due largely to the opening of daylight as well as night at-

tacks against U-boats on passage between Norway and the main German Baltic submarine bases. The daylight element of this offensive was launched by the *Mosquito* and *Beaufighter* anti-shipping wings armed with rockets, and accounted for four U-boats. But the high proportion of surface to air sinkings showed clearly the vital importance of maintaining really big numbers of surface hunting craft.

Most valuable support was given during March and April by the heavy bombers of Bomber Command and the United States Eighth Air Force who in attacks on the principal U-boat bases and building yards destroyed thirty-six boats. But in spite of these losses the number of U-boats on patrol increased right up to 4 May, when there were over seventy at sea, of which twenty were in inshore areas. Six ships were torpedoed in May, and there was every indication that the U-boat was still very much alive.

Then came the last mad week. Just as the advance of our armies in France had forced the U-boats out of the Biscay ports, so now again, in conjunction with the Russian armies from the east, they repeated the performance in clearing the Baltic bases and training grounds. Coastal Command aircraft of all types were joined by aircraft of the Second Tactical Air Force in a veritable holocaust of destruction, in which twenty U-boats were destroyed—fifteen by Coastal Command and five by the 2d TAF before the capitulation of Germany called a halt to their operations on 8 May.

The anti-shipping squadrons indulged themselves in a similar orgy of destructive attacks. Operating from Scotland and from advanced bases on the Continent, they converged on the shipping in the Belts and the Kattegat, and in these last weeks of the war sank sixty-nine enemy merchant vessels and light naval craft.

Results

During the whole period from mid-May 1944, till the end of the war, sixty-six U-boats were sunk outright by Coastal Command aircraft and nine in cooperation with naval surface craft, while sixty-five were sunk by naval forces alone; thirty-nine more were damaged by Coastal Command. In all 124 anti-U-boat aircraft were lost.

In the same period eighty-nine merchant vessels, totalling some 220,000 tons, and ninety naval craft of all types were sunk by the anti-shipping aircraft. A further ninety-five merchant ships and naval craft were seriously damaged. For these successes we paid the price of 224 losses in anti-shipping and reconnaissance aircraft.

However much we are able to keep the technique of air defense in the forefront of technical progress, it is no use pretending that it can be a substitute for the offensive use of air power. The best deterrent to armed aggression, and indeed the only real answer to it, is the science, the strength, and the confidence of our punch.

Air Marshal Sir Roderic Hill

The outstanding point about the Battle of Normandy is that it was fought exactly as planned before the invasion. The measure of our success was, in the event, far greater than could have been foreseen, because of the faulty strategy of the enemy.

Field Marshal Viscount Bernard L. Montgomery

The Antitank Regiment

Digested by the MILITARY REVIEW from an article by Major G. P. Marriott, ED, Royal Canadian Artillery, in the "Canadian Army Journal" (Canada) February 1948.

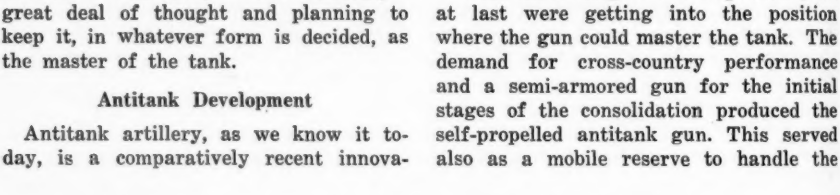
THE antitank regiment, properly organized, handled, and equipped with the acme in weapons, constitutes a definite deterrent to the use of armor by a potential or actual enemy. It is an integral and vital part of our military defenses. As such it warrants, in fact demands, a great deal of thought and planning to keep it, in whatever form is decided, as the master of the tank.

Antitank Development

Antitank artillery, as we know it today, is a comparatively recent innovation. A start was made during World War I which died out after the war. In the late thirties came the first decisive step to form a separate antitank branch of the artillery. The weapon chosen was the 2-pounder antitank gun. The 2-pounder was an excellent little gun but pitifully inadequate in the face of the heavily armored *panzer* divisions, as was demonstrated prior to Dunkirk.

Alive at last to the paramount need of antitank defense, the British Army converted many infantry regiments to antitank, and new and heavier guns were developed. Each corps was to have an antitank regiment in addition to one per infantry and armored division. The 6-pounder made its appearance and replaced the 2-pounder. More powerful than the 2-pounder, it was still inadequate and gave way to the hard-hitting 17-pounder. The 6-pounder was given to the infantry battalions as their local and immediate antitank defense.

With the coming of the 17-pounder, we at last were getting into the position where the gun could master the tank. The demand for cross-country performance and a semi-armored gun for the initial stages of the consolidation produced the self-propelled antitank gun. This served also as a mobile reserve to handle the counterattack and was ideally suited for working with armor.



17-pounder antitank gun and prime mover.

The position today is one antitank regiment per corps and one per infantry and armored division. The corps and armored division regiments are 100 per cent self-propelled and the infantry division regiment 50 per cent self-propelled and 50 per cent towed. All are equipped with the 17-pounders.

The question now arises "What should be done with the antitank regiment?"

Orthodox vs. New Weapons

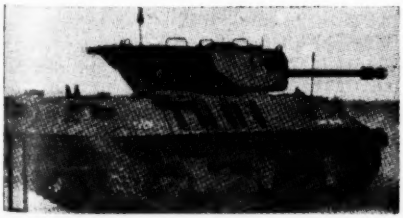
1. *Should we continue to develop its weapons along orthodox lines or swing over to unorthodox types such as recoilless weapons?* Development of more

heavily armored fighting vehicles has shown that the penetrative performance of existing weapons is inadequate. Obviously the development of much more powerful antitank weapons must be pressed energetically. This development should aim not only at producing the answer to existing armored fighting vehicles, but also to the most heavily-armored fighting vehicles which it is considered practical to build. This may call for penetration of up to sixteen inches of armor plate.

The United States is concentrating on the recoilless weapon. Being the foremost advocates of this type of weapon, they are perhaps further advanced along these lines. Great faith is placed in the shaped charge for projectiles, which type is entirely suitable for the recoilless weapons.

The main advantage of the recoilless weapon is its light weight. Against that may be balanced its relative inaccuracy, rearward blast and limited range, plus the great weight of projectile and propellant (twice that of the normal gun).

The United Kingdom, on the other hand, feels that the future of the recoilless weapon is not sufficiently assured to warrant a change to it in the near future. The United Kingdom will concentrate on



17-pounder antitank gun, self-propelled.

and continue the development of heavier and more powerful guns of the orthodox type. Included in this program are the shaped charge and sabot type of projectile.

The chief advantage of this is the fact that the principles of design and construction are already familiar and have been proved in battle to be effective. With orthodox guns there is virtually no limit

6-pounder antitank gun.

to the thickness of armor which may be penetrated. The disadvantages are weight, cost, engineering and manufacturing problems in mass production, as well as maintenance.

Artillery Control

2. *Should it remain under artillery control?* The United States feels that the limitations of towed antitank guns outweigh their advantages in many situations. Also, the development of tanks with heavy armor and guns obviates the necessity of self-propelled antitank guns or, as they are called in the United States, "special armored vehicles of the tank destroyer type." Therefore the United States advocates that the antitank responsibility be allotted to the armored corps with a staff officer at division, corps and army headquarters to coordinate antitank defense. Each division, corps and army would then have allotted to it a proportion of tanks in the antitank role.

The only time that they would come under control of the artillery is when they are employed as field artillery, i.e., indirect fire in a fire plan. The United States doctrine is to encourage this use whenever the tanks are not carrying out

their primary antitank role. In the matter of antitank guns operating in a field artillery role when not engaged in the primary antitank role, the United Kingdom policy is in agreement with that of the United States.

Due to the distribution of armor and the need for great mobility in a tank, the size of gun which can be mounted on it is limited. There is, therefore, a limit to the penetrative power which can be given to a practicable tank because of the limitation of size and weight of both guns and ammunition which can be put into it.

The acceptance of limited traverse in a self-propelled gun and the different distribution of armor as compared to a tank allow for a heavier orthodox gun being mounted on a mobile self-propelled carriage. Following this principle, the United Kingdom feels that the advantage lies in developing the self-propelled antitank gun along orthodox lines rather than relying on tanks in the antitank role.

The Americans had their tank destroyers as a separate arm in World War II and, as has been pointed out earlier, subsequently changed their policy by incorporating the antitank responsibilities of the tank destroyer battalions in the armored corps.

In the event of a policy involving the incorporation of the self-propelled antitank element in the Armored Corps and following the United Kingdom policy of retaining the towed gun, should the towed element go to the infantry? It is the infantry who need the *immediate* support of towed guns in their bridgeheads.

There were cases in World War II when the infantry, relying on the gunners to produce the necessary antitank defense, did not get their guns across and into the bridgehead. The result was no immediate antitank defense and a comparatively easy success for the armored counterattack.

There are several arguments pro and con as to whether the antitank should be an arm of its own, come under artillery control or be broken up, with the self-propelled element going to the Armored Corps and towed guns to the infantry. The British policy is to keep it under artillery control.

Self-Propulsion

3. *Should it be 100 per cent self-propelled?* The Americans, having allotted the antitank responsibility to the Armored Corps, would appear to favor 100 per cent self-propelled. The recoilless equipment again becomes the crux of the problem. With the powerful light recoilless weapons in the hands of the infantry battalions, the need for towed equipment disappears.

The British, on the other hand, following the policy of orthodox development, are pretty well forced to retain the towed gun. Admittedly, this type of equipment is awkward and often difficult to man-handle. However, the weight factor greatly influences the situation. The question of crossing light bridges and rafting guns across to a bridgehead to reach a desired gun site necessitates a greatly reduced weight which can be achieved by the man-handling of a towed gun into position. There is, also, as always with mechanical equipment, the greatly increased load on Royal Canadian Engineers services which would accompany a policy of 100 per cent self-propelled.

There has been, and still is, a race between the tank and the gun. The point to bear constantly in mind is that the antitank arm(s) and its weapon(s) must be organized and developed to the pitch where once and for all it provides the threat against which no enemy will dare pit his armor. Until this stage has been reached, great energy and sober thought must be devoted to this end.